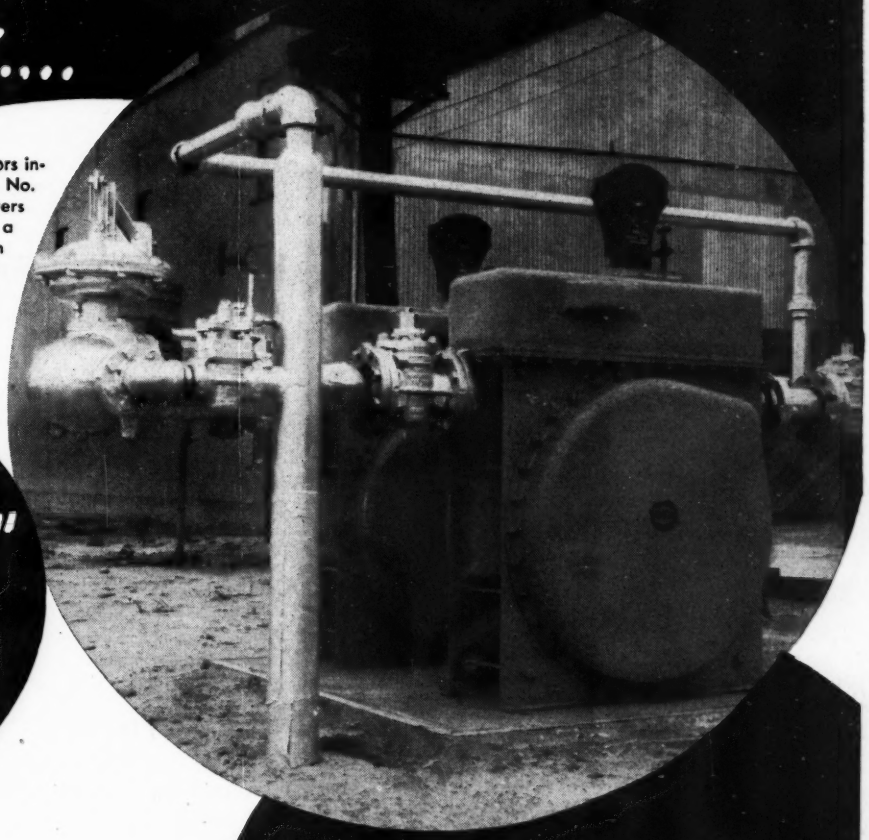
ROCKWELL-EMCO

METERS and REGULATORS....



Out-of-doors installation of two No. 5 Rockwell-Emco meters with Emcorectors serving a sugar-dehydration plant in Texas. Line pressure is controlled by a Rockwell-Emco high pressure balanced valve regulator and Nordstrom valves.

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Inside and Out....

You can rely on Rockwell-Emco meters and regulators to stand up under the toughest operating conditions. Bodies and parts are subjected to rigid test to insure dependable service. The high impact resistance of these units minimizes chance of damage from external causes. Sturdy mechanisms, built around carefully engineered designs, assure long life with minimum attention.

Rockwell-Emco meters and regulators go together like hand in glove. You can make measurement engineered pairings from the most complete selection in the industry.

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Mr. Flameless is no match for Miss Flame (above). If the reason isn't obvious, turn to pp. 40-41.

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EDWARD TITUS

THERMALLY THINKING

The Merchandising Trend

ONE CANNOT AFFORD to underestimate the influence of gas utilities in selling appliances.

At the highly successful panel on the subject of introducing natural gas into manufactured gas systems, which was a big feature of the AGA convention, the audience could not help but be impressed by details of the remarkable progress made by Minneapolis Gas Co., whose president, Harry K. Wrench, was a panel member.

This company, whose story of how it boosted gas sales seven-fold was carried in September *GAS* under Mr. Wrench's by-line, is one of the most aggressive merchandisers in the country. It has followed this policy since it became evident in 1935 that Minneapolis would get natural gas.

While Minneapolis Gas is definitely one of the leaders in merchandising, it can be said that similar practices are now being followed by two-thirds of the United States gas distributing companies.

In Minneapolis and these other cities, sales and promotion originate directly with the company. The company is thus the prime factor in influencing appliance sales. When dealers are involved, the company's influence also is very strong. The company itself sends direct-mail advertising pieces advising replacement of electric appliances in use 10 years or more with new gas appliances.

As a result of this and other methods, in 1949, *the ratio of gas to electric range sales in Minneapolis was 52 to 1, as compared to a national ratio of 1½ to 1!* It has been accomplished entirely through the aggressive promotion efforts of the gas company.

People's Gas Light & Coke in Chicago is another company that carries on a most active merchandising program of its own, on a somewhat different plan from Minneapolis.

Further evidence of the increasing awareness of the great importance of what the gas company itself can and must do to influence appliance sales was had from the speech in Atlantic City of W. L. Hayes, general sales manager of Montana-Dakota Utilities Co., Minneapolis.

As natural gas advances into new areas, practices similar to those worked out in Chicago and Minneapolis will be increasingly prevalent. Companies will have more gas of a higher heat value to sell, often at a lower price. Boosting gas load will be both an opportunity and a necessity. It thus will become more imperative for gas utilities to strengthen their own sales efforts.

When things are done in a big way, as they will be in the years just ahead, the influence of the gas utility is particularly big. We're referring to big housing projects, new subdivisions, and the many Army and defense worker housing developments we are likely to have soon. Appliances for these big jobs can most often be sold directly in one great big package by the gas utility.

During a period of mobilization utilities will realize more and more that strengthening their own merchandising efforts is the way to maintain and improve their position against competing fuels. It is possible that other marketers will have no special motive for selling one kind of appliance or another kind.

Who except the gas utility has a vital, compelling interest in boosting the gas load?

Who's Responsible?

RESPONSIBILITY IS A QUESTION closely related to the influence of gas utilities in selling appliances. The responsibility of the gas company for performance never ceases whether the gas utility itself actually puts in the appliance.

However, when the gas company is the prime factor in the sale and installation, or exercises some control over it, both the seller and the purchaser have added assurance, from the angles of safety and efficiency. For example, there are assurances that the controls used and the methods of installation will be in accord with approved practices of the gas company, the AGA, and the manufacturer.

Dealing through an established utility, the manufacturer has added assurance of maintaining the good will of the customer. The utility, which will continue to be in business throughout the life of the appliance and much longer, will feel a co-responsibility with the manufacturer for the satisfactory, efficient, and safe operation, and proper servicing of the appliance.

This year's big GAMA show at the Atlantic City convention was convincing evidence that one can't afford to underestimate the influence of gas utilities in selling appliances.

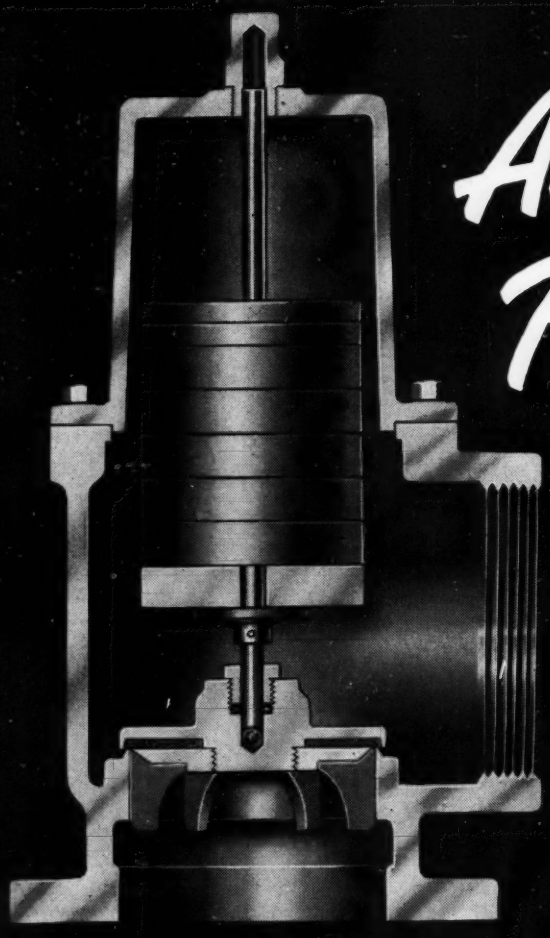
Otherwise why did the manufacturers spend so much money on this show?

Gas Needs a Separate Defense Setup

IF GOVERNMENT AUTHORITIES follow the suggestions of the national defense committee of the American Gas Assn., i.e., that a separate Gas Administration for Defense and a Gas Industry Advisory Council be set up, it will be much simpler for the industry to bring about its full usefulness in the mobilization program than if gas as a fuel is subordinated to other fuels.

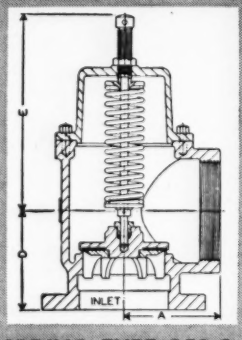
The last war presented convincing evidence of the difficulty of having to go to many different Washington agencies for different kinds of authorization.

The committee has pointed out that since 1940 the annual steel requirements of the gas industry, exclusive of production activities, have increased so that they now total as much as the steel requirements of the oil industry for all operations except production. Moreover, the gas industry is regulated at national, state and local levels. The existence of such regulation occasions numerous special problems not present in the non-utility petroleum industry. It would seem much the best public policy to accord the gas industry a separate defense administration setup, for purposes of efficiency and in view of the gigantic part it will play.

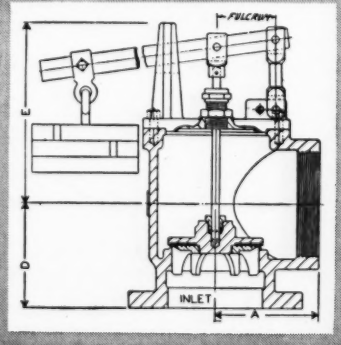


Assured Protection!

Safety



SPRING TYPE-250 S



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Assured protection against overpressure is an essential feature in *good pressure control.*

The *CHAPLIN-FULTON* Safety Valve provides accurate predetermined relieving pressures with known discharge capacities, plus leak-proof construction.

Available in three types covering a wide range of pressure settings.

ACCURATE CP MFG. CO. *DEPENDABLE*

Chaplin-Fulton

MANUFACTURING COMPANY

***Write for Bulletin 250 and Technical Paper 104*

GUY CORFIELD

TECHNICAL TRENDS

"Salting Down" Propane

IN THE AUGUST 1950 ISSUE, this page carried an item titled "LP-Gas Storage Underground," describing the use of a water sand to store LP-Gas by displacement of the water. Another and very ingenious method of underground storage of hydrocarbon liquids has been announced whereby liquid propane is stored in a basin hollowed out of a salt bed.

This development is at the Sid Richardson gasoline plant in the Keystone field, nine miles north of Kermit, Texas. The salt bed is from 400 to 800 ft in thickness, 2000 ft below the surface, and the reservoir was created by dissolving out the salt with fresh water. A hole was drilled to within 100 ft of the bottom of the bed and then water was injected through the tubing and brine withdrawn from the casing.

It was calculated that 6 bbl of fresh water formed 1 bbl of storage space. After 7500 bbl of space were developed, 1500 bbl of propane were pumped into the casing at the rate of 300 bbl per hour, requiring about 400 psig.

The propane was then forced out by pumping water back in through the tubing. No contamination of the propane was found other than a slight trace of moisture. This storage was developed at a cost of $2.50 per barrel, compared to about $15 per barrel for steel tankage.

National Bureau of Standards

THE NATIONAL BUREAU OF STANDARDS is generally understood and referred and resorted to as the highest authority in the nation on scientific and technical matters. It may be interesting to review its basic functions and some of the detailed activities that are of special interest to the gas industry.

The bureau was founded in 1901 within the jurisdiction of the U.S. Department of Commerce. As described in a recently issued circular it is "the principal agency of the federal government for fundamental research in physics, mathematics, chemistry and engineering . . . has custody of the national standards of physical measurement in terms of which working standards in research laboratories and industry are calibrated." As more specifically stated in an act passed by Congress this year to clarify and re-state the bureau's functions, they are (as listed in a NBS release dated Sept. 11, 1950):

1. The custody, maintenance and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with these standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted by the government.
2. The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.
3. The development of methods for testing materials, mechanisms, and structures, and the testing of materials, supplies, and equipment, including items purchased for use of government departments and independent establishments.
4. Cooperation with other governmental agencies and with private organizations in the establishment of standard practices, incorporated in codes and specifications.
5. Advisory service to government agencies on scientific and technical problems.
6. Invention and development of devices to serve special needs of the government.

Under these general functions are listed 19 activities, several of which are as follows:

Testing, calibration, and certification of standards and standard measuring apparatus.

This is a testing service that is available to industry, under prescribed conditions, for a fee. The details are outlined in NBS Circular 483: "Testing by the National Bureau of Standards; Policy, General Information, Fee Schedules," available from Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., at a price of 25 cents. The types of test are restricted, in general, to the following: "Comparison of laboratory standards or instruments with the national standards . . . tests of other devices and materials which are critical in laboratory or industrial operations and for which suitable testing and calibration facilities are not available elsewhere (the bureau does not compete with qualified commercial testing laboratories nor does it have the authorization, funds, or facilities for general testing for the public) . . . referee tests or investigations where private laboratories are unable to agree on the method of measurement, the results of tests or the interpretation of these results . . ." Tests that will not be undertaken are "general tests where commercial laboratories are available . . . trivial tests . . . duplication of previous work . . . tests of inadequately described materials, devices or processes . . . tests or investigations of secret processes . . . tests when the objective is one of public relations, advertising, or sales promotion."

Study and improvement of instruments and methods of measurement.

This is being done through an "office of basic instrumentation" and involves systematic and comprehensive analyses of available methods and devices for laboratory and field measurements of physical magnitudes in terms of their limitations in precision and reliability, and work leading to development of new and improved instruments for specific purposes.

Preparation and distribution of standard samples.

This was discussed in "Technical Trends" in the March 1950 issue of *GAS* under the heading "Standard Samples."

Development of methods of chemical analysis and synthesis of materials.

Study of methods of producing and of measuring high and low temperatures, and behavior of materials at high and low tempertures.

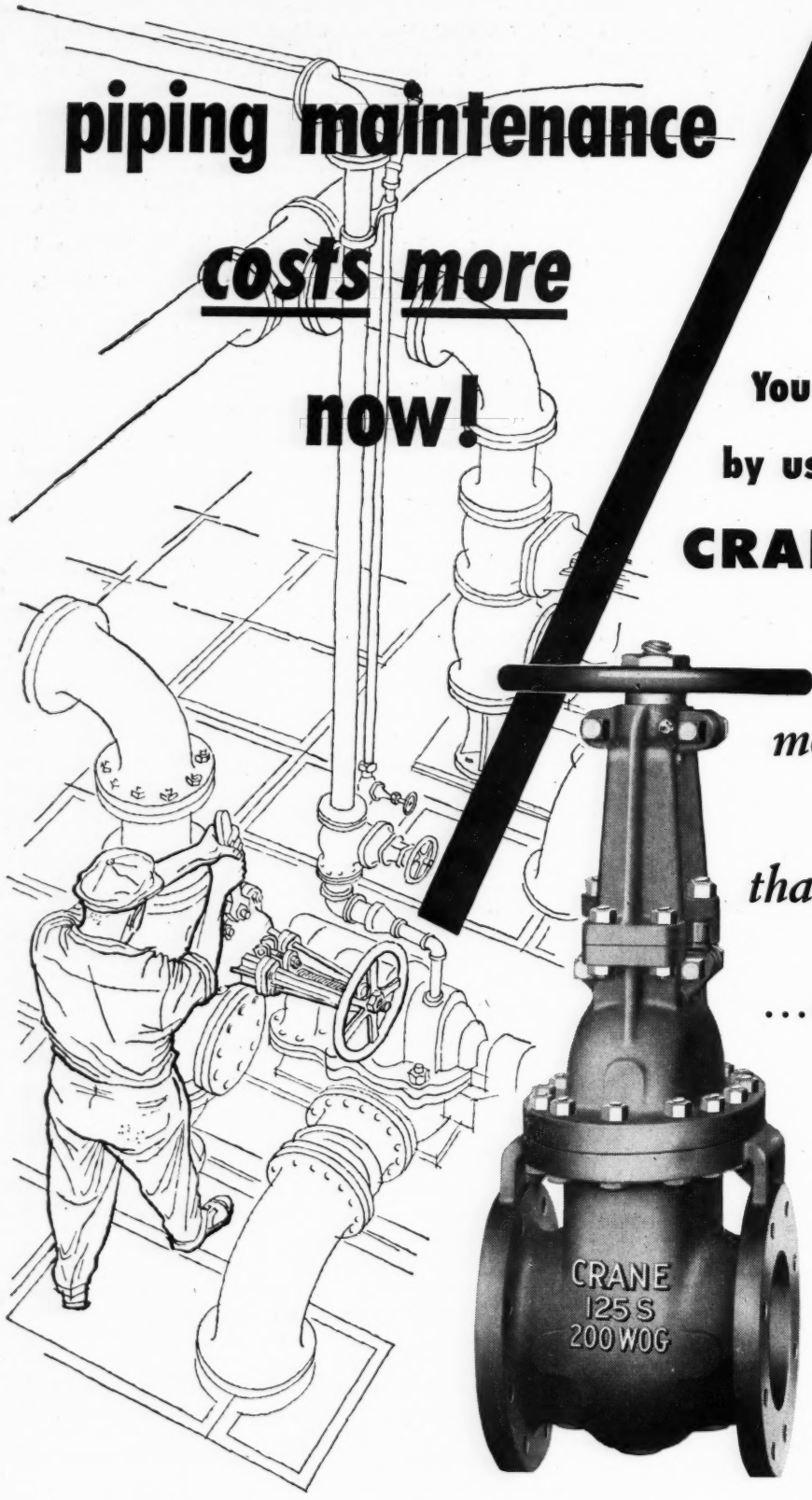
Determination of properties of building materials and structural elements.

Metallurgical research, including study of alloy steels and light metal alloys.

Compilation and publication of general scientific and technical data when such data are of importance to scientific or manufacturing interests or to the general public, and are not available elsewhere.

It is obvious that the bureau's activities are of wide scope and extreme interest and value to those concerned with scientific and technical matters, and that its vast store of information should be taken advantage of by inquiry on specific problems and perusal of its various publications.

piping maintenance costs more now!



You do less of it

by using Dependable Quality

CRANE VALVES

That's why more Crane Valves are used than any other make

. . . no bonnet trouble with this valve

A typical example of low-maintenance Crane Quality—No. 465½ 125-Pound Iron Body Gates. Rarely does the bonnet joint need attention. Flange construction includes reinforcement to prevent distortion and utilizes more bolts, more closely spaced than is usual in valves of this class. Crane precision-guided seating reduces seat and disc wear. Packing has long life because these valves have a deep stuffing box filled with high grade asbestos ring packing. A ball-type gland equalizes the packing load.

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STANLEY JENKS

PROMOTIONAL NOTES AND NOTIONS

Loss Leader

BECAUSE THE ELECTRIC RANGE has very poor load characteristics, coinciding with the average system peak, it is pretty well considered a loss leader in electric circles to ease the way for more desirable domestic load; such as automatic storage water heaters, garbage incinerators, and suchlike.

In his paper at the Edison Electric Institute in June, F. A. Compton, vice president, the Detroit Edison Co., estimated that 100,000 electric ranges sold in their 5-year plan will produce $2,900,000 annual revenue, with an addition of 83,000 kw to the system peak. That is, the electric range peaks the system to the extent of $35 revenue per kw-year, which in itself is anything but desirable business.

However, as Mr. Compton points out, there is plenty of evidence that greater saturation of other electric appliances coincides with electric range installations. Therefore, the electric range is the door-opener, the "open sesame" to services we need and can accomplish better.

The "loss leader" characteristics of the electric range explains the desperate lengths to which some electric utilities will go to get it installed.

The especially unfair tactics of the municipally owned Seattle City Light are worth noting. Seattle City Light admittedly gives every electric range purchaser an installation subsidy of up to $75. Should the house already be wired for a range, Seattle City Light will install without charge an electric water heater of 50-gal. capacity or over. This is a subsidy of around $35.

Of course, such practices are nothing new in the electric range promotional field. Twenty-five years ago it was happening just the same, and might then have been partly justified by the novelty. But, after 25 years, you'd naturally expect the need for such tactics to have disappeared, if any notable success had been achieved.

The answer undoubtedly lies in our superior CP range, which still remains cock of the walk in the cooking appliance field.

Public Ownership

FOR THOSE WHO THINK the government ought to own and run our public utilities, please note that the nationalized transportation system in Britain, operating British railroads, inland waterways, and port facilities, lost $58 million in 1949, despite a freight rate increase of 16⅔% in May 1949.

The British, who have a better sense of political morality in such matters than we have, nevertheless cannot make a go of the Arcadia-on-paper our popeyed political ownership planners have in mind.

The answer, of course, is that, when ineptitude replaces efficiency and bureaucracy smothers initiative, unprofitable operation is inevitable.

So, just as with our TVA, whenever a Britisher rides a train, some other taxpayer pays part of his fare. Such is Socialistic equality.

Year-round Air Conditioning

THE ADDITION of 1,150,000 home heating customers—approximately 15% in a year—is a harvest the gas industry is reaping after many years of plugging and plodding to convince Mr. and Mrs. John Q. Public that we have the ideal heating service.

The industry itself is fortunate that it has the high quality equipment manufacturers with resources and facilities to fill the demand for gas heating equipment. Years ago, it was a pretty discouraging venture indeed to depend on gas heating equipment solely as a production item, and many were obliged to either produce for other fuels or keep their home heating equipment as a side line during the pioneering era. Today, the position is changed, and most, in fact all, reputable heating equipment manufacturers are majoring their gas designed equipment. The evidence can be readily found in the advertising pages of the heating trade publications.

Even though we are over the hump promotionally, and our only apparent limitation is the peak of our present capacity, especially in parts of Ohio and Michigan, we still have a long way to go.

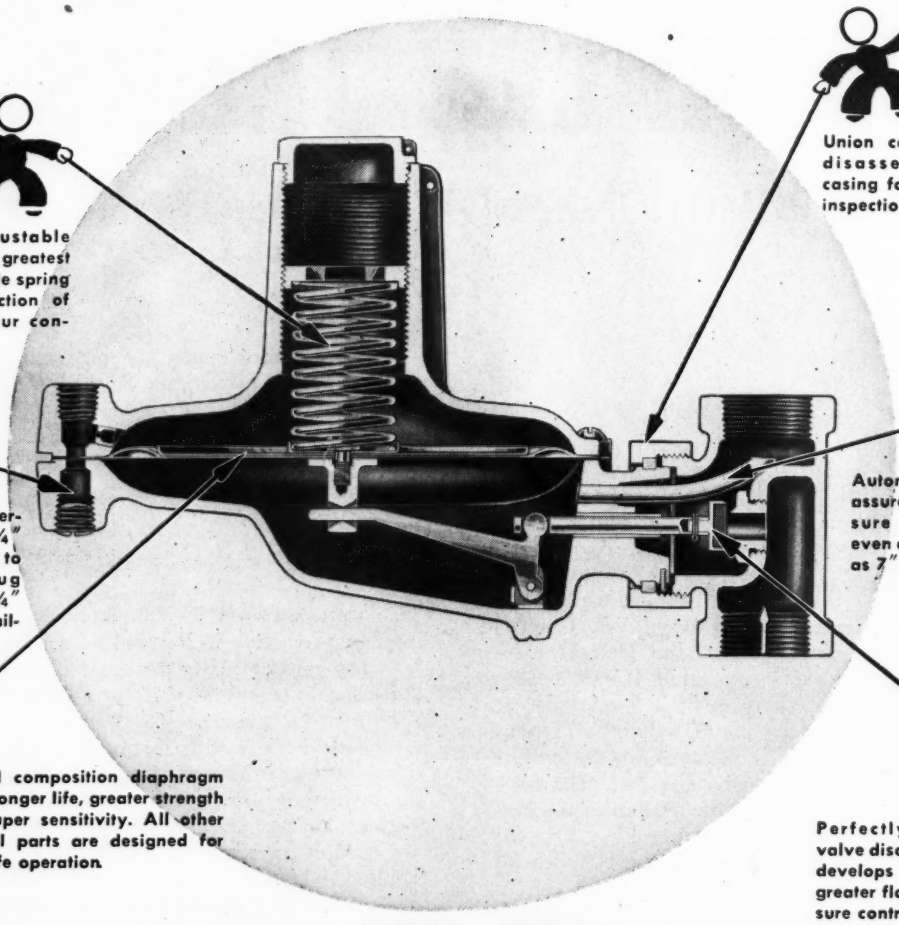
Winter heating is only air conditioning for a few months. To balance the load and fully exploit the all-year-round air conditioning field available to us, we need the same aggression and determination now as we had years ago in the heating field. The accomplishment of the one has created the opportunity for the other.

Summer air conditioning with gas has a major place on our promotional program.

Proof of Profits

RIGHT NOW, our commercial sales boys are (or should be, according to schedule) engaged in the noble purpose of modernizing the gas equipment in beaneries, diners, restaurants, and hotels.

It is no uncommon complaint these days to hear the little woman say, "It's really cheaper to eat out," as the grocery and meat prices climb higher, stimulated by the price supporting of the politicos. Therefore, the restaurant operators are having themselves a good time. The fun, though, is not in the long hours, labor difficulties, and persnickety customers primarily, but in the "take." The latter is their urge to carry on and do better with better equipment. The physical and economical fuel advantages of gas, plus the modern efficient commercial equipment available, is our sales story —and what a successful story it can be, properly told and insistently presented.



Highly calibrated adjustable spring loading produces greatest regulator sensitivity. Wide spring assortment allows selection of one best suited for your conditions.

Fisher offers many different types of vents from ¼" top or bottom as shown, to large weather and bug proof outside vents. ¾" pipe size vent also available.

Special composition diaphragm gives longer life, greater strength and super sensitivity. All other internal parts are designed for long life operation.

Union connection allows easy disassembly of diaphragm casing for installation, repair or inspection.

Automatic loading pitot tube assures constant outlet pressure and greater capacity even at inlet pressures as low as 7" W. C.

Perfectly guided renewable valve disc with screwed in orifice develops low lockup pressure, greater flows and excellent pressure control.

FISHER®

SERIES 730 SERVICE REGULATORS

EVERY REGULATOR BUILT AND TESTED EXACTLY FOR YOUR CONDITIONS

•

FISHER LEADS THE INDUSTRY IN RESEARCH FOR BETTER GAS PRESSURE CONTROL

Gas distribution engineers have recognized the Fisher Series 730 Service Regulators for their many superior engineered features.

Fisher 730 Regulators have been selected over all other regulators on 5 recent major utility pressure elevation programs.

We will gladly supply regulators for you to test on your operating conditions. Prove for yourself the convenience of the union connected two-piece body—the superior quality of parts and machining—the better pressure control plus extra capacity which only the Fisher Series 730 Regulators provide.

WRITE FOR CATALOG P-10 OR SAMPLES

Fisher Governor Company

MARSHALLTOWN, IOWA

Industry 'In Good Shape' To Meet Emergency

Atlantic City conclave finds gasmen apprehensive about materials shortages, but confident they can meet civil, military requirements.

By Edward Titus

TWO PRESIDENTS were caught in convention camera when outgoing AGA headman Hugh Cuthrell greeted Harold E. Stassen, president of University of Pennsylvania, who was principal speaker.

ACCOUNTING SECTIONEERS: (left to right) H. F. Carey, Long Island Lighting; A. A. Cullman, Columbia Engineering Corp.; E. L. Bjork, Peoples Gas Light & Coke; J. H. W. Roper, Washington Gas Light Co.

TEXAS Tessie and Mrs. Flame symbolized the spirit of the gas industry in 1950, as more than 8000 converged on Atlantic City Oct. 2-6 for the 32nd annual convention of the American Gas Assn.

Tessie, a blonde in a bronc-busting costume and 10-gallon hat—suggesting the epoch-making arrival of the new fuel from Texas—was visible everywhere. She represented a smart promotion stunt of the South Jersey Gas Co.

Mrs. Flame, a swift-moving, neat individual in a red bathing suit, was accorded highly justified wolf whistles as she moved onto the ballroom stage to represent the smooth-but-effective fight that gas is putting up against the competing fuel, Mr. Flameless.

She's smooth, clean, cool, fast (but dependable). And F. A. Kaiser of Detroit-Michigan Stove really went to town in a bang-up eight-point proof of Mrs. Flame's superiority.

In the last year, the gas industry has made significant headway in developing dramatic and effective weapons to meet electric propaganda.

Praise is due also to Harper-Wyman Co. for its convincing demonstration along similar lines in the GAMA show; also to Caloric Stove, who put on a competitive exhibit its demonstrator suggested ought to be in every gas company office, right where customers come in to pay their bills.

Mobilization? Inflation? The menace of Creeping Socialism? The World Series? The Weather?*

All these were, of course, on delegates' minds. But it seemed to us that members of the industry were glad to be back in Atlantic City again, meeting their friends, absorbing a lot of know-how about how the other fellow does things, having lobster at Hackney's.

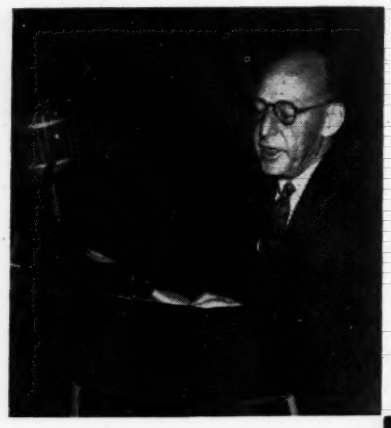
There had been a sharp recovery in morale and return to common sense since mid-summer. But it was sinking in now that the mobilization and the civilian economies were going to have to carry on simultaneously. Many discussed privately current problems about supply of steel. But then steel problems have been a habit for well nigh onto a decade . . .

Reports from authentic sources indicated the steel industry is in good shape over the medium-long pull, for both mobilization and civilian needs.

Consistent theme of a number of speakers in the know was that now is the time for gas companies to strengthen their sales forces. Don't let temporary shortages and the fact customers are lining up for appliances relax the battle to sell effectively the increased natural gas supply arriving

*Better than two years ago.

OPERATING IDEAS: Talking them over are A. V. Brashear, Michigan Consolidated; H. B. Andersen, Philadelphia Gas Works; G. K. Bachmann, Public Service Electric & Gas; and F. J. Hall, MichCon.



INTRODUCTION of a speaker to AGA delegates is made by G. E. Whitwell, Philadelphia Electric Co. and chairman of convention committee.

HARDER SELLING was prescribed for the emergency period in a speech made by D. A. Strickland, United Gas Corp., at the dealer meeting.

MRS. AMERICA and two lovely friends (above left) were on stage to help out with the "Formula for Sales" presentation given by the residential gas section.

SITTING ONE OUT are the operating section men below: (left to right) R. L. Davis, Public Service of Colorado; W. L. Thackrey, Colorado Wyoming Gas; F. T. Parks, Public Service of Colorado; R. T. Richards, Central Arizona Power & Light; and B. T. MacCannon, Public Service of Colorado.

FOUR ECONOMISTS are pictured above: Ruth Soule, Brooklyn Union; Ruth Severson, Peoples Natural; Mary Huck, Ohio Fuel Gas; and Mary Louise Bohn, Laclede Gas.

in the Northeast. That has to do with the long term trend.

Judging by feminine attendance and interest, most oomph-full speaker at the convention was Harold E. Stassen, now prexy of the University of Pennsylvania. He really packed 'em in. Practically every gasman's wife and every AGA or gas company female employee was there, as well as most of the men, making an SRO audience.

A few of Stassen's thoughts:

1. The economic freedom of men is inseparable from other freedoms . . .
2. Utilities under management of citizens and not of government are an important bulwark of freedom . . .
3. If the Soviet were to start a world war tomorrow, I'm confident the United States would win that war despite initial reverses . . .
4. I believe we can carry on a mobilization program for 10 years and yet maintain a sound, free economy . . . (Mr. Stassen warned, though, that there will be threats to that sound, free economy.)
5. Inflation is extremely dangerous, the cure not a pleasant one, and inflation is a political coward's method, a pernicious anemia . . .
6. At least $5 billion a year could be taken out of the federal non-defense budget, and leave us better qualified to ease the manpower situation . . .

Frog Song

Arch N. Booth, executive vice president, Chamber of Commerce of the U. S., had a good idea about a frog. Seems experimenters have found if you put a frog in water and heat it quickly he'll jump out. If you heat it gradually, he'll go to sleep and be cooked.

Don't be like the frog, Mr. Booth warned. The American people wouldn't vote for socialism, if it were put squarely up to them. But they're likely to get it gradually through tireless efforts of social planners in Washington.

Those who took advantage of the good weather to walk down the boardwalk to the Ambassador for the luncheon of the Liquefied Petroleum Gas Assn. heard Maj. Gen. Leslie R. Groves, the "atom general," give his hearers some rather frank "guesses." He wouldn't undertake to tell what was in Joe Stalin's mind, and emphasized he was just guessing.

USSR Vulnerable

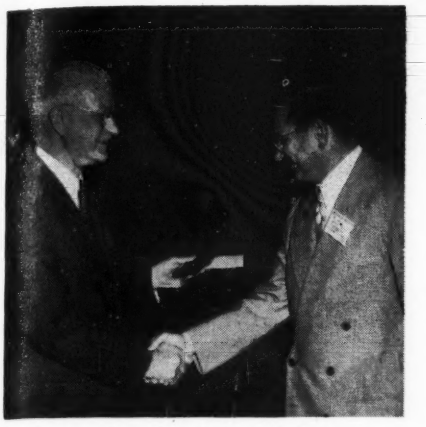
Soviet industry, General Groves indicated, is more concentrated, more vulnerable to atomic attack than American industry. And we have a lot more atomic bombs than the Russians right now. We were able to move a good number of troops into the Korean picture and maybe comparatively neglect other parts of the world, because we have the control of the atomic bomb.

And the minute Joe moves, we drop our bombs.

General Groves just guessed, but he

RECOGNITION

Traditionally, in its annual conventions the AGA honors those men and women who, in their respective fields, have contributed most to the gas industry during the association year. In these photos, President Hugh H. Cuthrell is shown bestowing the awards on this year's choices.



BEAL MEDAL. For "the best paper presented at an association meeting during the year," W. C. Mosteller, assistant to the vice president, Southern Counties Gas Co., Los Angeles, received this bronze plaque, and cash. Judged the most valuable contribution to the industry's methods of meeting peak load problems, Mr. Mosteller's paper covered methods of calculating costs and capacities in transmission line type storage of natural gas. (Presented at the Natural Gas Department spring meeting, it was published in abridged form in GAS, June, pp. 85-88.)

DISTINGUISHED SERVICE AWARD. This, the highest honor, went to Edwin L. Hall, AGA Laboratories director, whose high-Btu process and "extensive and helpful participation" in association work were together deemed the outstanding contribution toward the advancement of the gas industry. The process has enabled manufactured gas companies to boost production, saving up to 30% in manufacturing costs.

AIR CONDITIONING AWARD. Chester May, vice president of Lone Star Gas Co., Dallas, accepts third annual progress award on behalf of the sales and engineering staff of his company. A check and plaque were presented in recognition of sales of 367 air conditioners, achieved by 21 full-time salesmen and 35 engineers. In line with Mr. May's slogan "Every Employee a Salesman," all company personnel furnished leads which aided the record sales effort. Servel is award sponsor.

HOME SERVICE ACHIEVEMENT. Mary E. Huck's "traveling food institute" won the Ohio Fuel Gas Co. (Columbus) home service director first prize among directors of departments employing three or more persons. Jane S. Ashby, Council Bluffs (Iowa) Gas Co., was honored among directors of small departments for her broiler promotion. Individual achievements brought awards to Maxine Howe, Southern Counties Gas, Los Angeles; Mildred M. Endner, Minneapolis Gas Co., and Violet R. Radman, Northern Indiana Public Service Co., South Bend. In the respective categories, Vivian L. Marshall, New Orleans; Florence J. Neely, Baltimore; Dorothy Buch, Mansfield, Ohio; Alice Strickler, Rutherford, N. J., won honorable mentions.

MERITORIOUS SERVICE. The life-saving act of Martin J. Dalton, Brooklyn Union, won him a gold medal and certificate. When co-worker W. V. Kopas was caught in a slide of breeze, fell into a chute, and was almost completely buried, Mr. Dalton climbed in and shielded him with his body, brushing away coke from Mr. Kopas' head until a rescue squad extricated them. He was almost completely buried himself.

HOUSE HEATING ACHIEVEMENT. For promoting and maintaining consumer demand, five men won the Coroaire honors. A. G. Bur, second from left, Wisconsin Public Service Corp., Green Bay, won $500 first prize for a sales and promotional program; Robert H. Lewis, Washington (D.C.) Gas Light, was second for $250; E. E. Boegli, South Carolina Electric & Gas, Charleston, won $150; E. R. Rothert, Cincinnati Gas, was fourth, winning $50; Earl E. Garrison, Oklahoma Natural, Tulsa, was fifth (sales manager M. H. North, far right, accepted his $50 check).

• Conventionally Speaking •

KISS FOR A KING. Denver's Denny Bell wins an added award—this from his wife (right) and daughter-in-law, as his son Douglas shows his approval.

Added attractions and incidental intelligence, mostly about the big GAMA show:

THE NATION'S NO. 1 gas water heater salesman for the second year in a row, Dennis A. Bell, Denver dealer, was crowned "King of the Court of Flame" during the special dealer day meeting held in conjunction with the exposition. His rewards included a three-day all-expense trip for two to the Atlantic City show, and $500 worth of Fiberglas articles.

Forty-nine runners-up, representing every state and Hawaii, were "knighted" and presented with parchment scrolls and Fiberglas merchandise valued at $50.

ON THE MORNING OF OCT. 6, a big airliner sped away from the airport at Atlantic City with more than three dozen gasmen aboard, bound for Miami Beach and Puerto Rico—courtesy of Servel, Inc.

The lucky — and hard-working — vacationers were the country's outstanding gas refrigerator salesmen in 1950, as determined in nationwide competition in Servel's "Big Six" campaign.

Winners were picked from seven categories in the program, which ran from April 1 to Sept. 10: gas companies, distributors, retail salesmen-national, retail salesmen-regional, distributor salesmen, dealers, and apartment house salesmen.

One representative was sent from each gas company, dealer organization, and distributor firm. Winning companies in the six regions into which the nation was divided were also accorded trophies.

Winning gas utilities and representatives:

Region A—Brooklyn Union Gas Co. Trophy accepted by Jack Frost. Trip representative, Frank Barnitz.

Region B—Manufacturers Light & Heat Co., Waynesburg, Pa. John W. McBurney.

Region C—Peoples Water & Gas Co., Fort Lauderdale, Fla. James F. Topping.

Region D—Peoples Gas Light & Coke Co., Chicago. Homer Pollan.

Region E—Houston Natural Gas Corp., Beeville, Texas. W. C. Dahlman.

Region F—Southern Union Gas Co., Carlsbad, N. Mex. Jonathan Youk.

Utility salesmen who placed among the top six in the nation, in competition with dealer men:

4th—George Bitinis, Southern Union Gas Co., Port Arthur, Texas.

6th—Michael N. Barbour. Michigan Consolidated Gas Co., Detroit.

Utility salesmen who won in their respective regions:

Region A—Harry A. Alward, Boston Consolidated Gas Co.

Region B—Carryl H. Pugh, Ohio Fuel Gas Co., Columbus.

Region D—Theodore P. Karcher, Peoples Gas Light & Coke Co., Chicago.

Region E—C. L. Byers, Southern Union Gas Co., Galveston, Texas.

Gas company apartment house salesmen, selected on a national basis:

1st—Hamilton King, Atlanta (Ga.) Gas Light Co.

2nd—Robert Eldredge, Brooklyn Union Gas Co.

3rd—William H. Denison, Michigan Consolidated Gas Co., Detroit.

In the national competition among companies in this classification, the Peoples Gas Light & Coke Co., Chicago, was the winner.

A 90% INCREASE in sales of "CP" gas ranges for the first eight months of 1950 was announced during the GAMA show by Harold E. Jalass, chairman of the association's "CP" manufacturers group. Industry plans call for a repeat of the two big sales factors in this year's success: the Spring Style Show in March, April, and May 1951, and the Old Stove Round Up next fall.

ALL OF THE GLAMOR in Atlantic City's convention hall was not inanimate. Betty Eileen McAllister, the Johnstown, Pa. housewife and mother who was chosen Mrs. America for this year, was a day-long visitor at the GAMA show.

A FUND OF SHOWMANSHIP IDEAS which utilities and dealers might copy was incorporated in the "gas carnival" put on by Servel on the auditorium stage. The entrance was set up like a Coney Island Fun House, complete with barker. Gay music, colorful banners gave the show a festive air . . . A sign suggests appropriate occasions for carnivals . . . the advent of natural gas, an anniversary, a "gas progress week" . . . there's a fortune teller, a cardboard figure which passes out cards telling how utilities will tie in with national promotions and local events . . . a pipeline panel and movie screen showing excerpts of the film "Gas for Home and Industry" . . . a "giant," a flame-headed figure lifting residential and commercial-industrial "loads" . . . a mammoth suggestion board containing dozens of ideas for literature, ads, radio and television, publicity, etc. . . . a "street scene" showing effective store fronts .. . a merry-go-round of gas appliances . . . a "ring-the-bell" concession . . . .

(Continued from p. 26)

didn't think Joe would bother us for quite a few years. The showdown will come 5 or 10 years from now, he thinks. We've got to keep our preparations and our civilian defense active in a period when there may not be any active incentive like a Korean war going on.

And how does all this affect the gas industry?

Feeling at Atlantic City seemed to be that the industry, ready always to serve, and with natural gas about to arrive in hitherto unpenetrated areas in a big way, should not only be prepared for an enormous role in the defense effort, but also for helping maintain the normal American way of life. And that means normal competition and selling.

W. L. Hayes, general sales manager, Montana-Dakota Utilities Co., thought the industry in effect should take a leaf from the Fuller Brush man. In other words, more people from the utilities themselves out pushing doorbells. Dealers are fine—the convention had an excellent dealer, manufacturer, utility night on Thursday—but who's going to be interested in pushing gas appliances specifically and boosting gas load except the gas utilities?

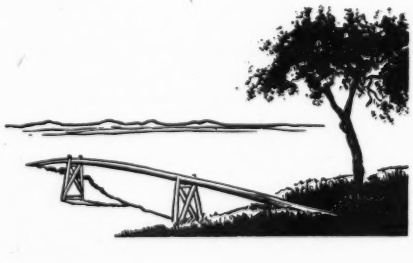
Of great interest was the experiment of holding a joint session of the natural and manufactured gas departments, natural about to reach every state of the union, and therefore becoming a unifying force. Said D. A. Hulcy, president of Lone Star Gas Co., Dallas:

"This meeting will determine whether we have reached a point in the operations of our association where the problems of natural and manufactured gas are becoming so common that a joint session seems to be the only solution for a discussion of them."

Mr. Hulcy succeeds Hugh Cuthrell of Brooklyn as president of the AGA.

This was the largest GAMA show ever, a far cry from the worries of midsummer . . . One manufacturer's exhibit got lost en route to Atlantic City, so representatives posted signs telling the entertaining but gruesome details, then sat around in their booth chatting with friends anyway . . . New television propostion of the AGA attracted big attention, and *GAS* takes a bow for helping initiate it (see separate story in this issue).

Next year: St. Louis, Oct. 15-18.



500,000,000,000,000

cubic feet of gas are still in the ground and recoverable, says the author, who bases his predictions on the probability that gas-to-oil ratios will increase in future discoveries

By **LYON F. TERRY**

THE American gas industry is having an unprecedented boom in the construction of natural gas pipelines. The existing lines to those large cities now being served with natural gas have been enlarged and are being further extended. Natural gas from Texas has reached Philadelphia and Staten Island, will soon reach all of New York City and vicinity, Buffalo and San Francisco, and there are proposals to bring natural gas to New England and to the Pacific Northwest. Hence, it may be timely to again inquire into the future supply of natural gas.

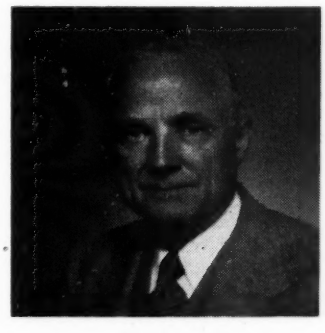
The status of the nation's known reserves of natural gas is reported annually by the American Gas Assn. committee on natural gas reserves. The chairman of that committee is N. C. McGowen, president of the United Gas Corp. and a former president of the association, and the committee is composed of some 60 engineers and geologists scattered throughout the country. Having worked with many of these men in times past, I am satisfied that their estimates are reliable and that they are rendering a most valuable and dependable service to the gas industry.

Proved Reserves

The committee's last report showed estimated proved reserves of natural gas in the United States as of Dec. 31, 1949, to be 180 trillion cu ft, and net production for the year 1949 to 6.25 trillion cu ft. It would seem at first glance that such reserves should be adequate for the nation's requirements, but the 6.25 trillion produced per year is being increased rapidly and will probably reach 10 trillion before 1960, so that there may be some question as to whether the presently *proved* reserves of gas are sufficient to justify the newly proposed pipelines. *But the proved reserves need not be considered alone, since a larger element of the future supply will be the yet undiscovered deposits of natural gas to be found in the future in the search for oil as well as for gas.*

The business of producing natural gas is a sister industry to, and in a sense part of the petroleum industry. Most natural gas is produced by oil companies, while considerable oil is produced by gas companies. Production of natural gas in this country approximates 18 billion cu ft per day compared with 5.9 million bbl daily of crude oil. In terms of Btu's, the production of natural gas is only 50% of the production of oil, but the proved reserves of natural gas amount to about 125% of those of oil. The origin, occurrence and search for oil and natural gas are closely related and the study of the future prospects of natural gas involves both of these natural resources.

The original source material for the formation of oil and natural gas was apparently the marine life which once inhabited ancient seas and was buried in the sediments laid down in those waters. Layer upon layer of such sediments under increasing pressure has been consolidated in the course of millions of years into the present sedimentary rocks. Thus, deposits of oil and natural gas are now found in the sedimentary formations of the earth in many different types of local folds, anticlines, salt domes, reefs, and traps located in the sedimentary basins which once comprised ancient seas.



Lyon F. Terry

Geologic Methods

The search for geologic structures which may contain such deposits will continue so long as the prospect of finding additional reserves will warrant the cost. Exploration is based upon geological studies aided by specialized techniques involving the use of the gravity meter, magnetometer, seismograph, and microchemical surveys of the underground from the surface, and studies of drilled areas through the logging of wells by coring and by electric and radioactivity measurements of the subsurface encountered in well holes, etc. The ultimate testing is accomplished by drilling since only the drill can conclusively determine the presence of oil or gas. Currently, some 470 geophysical parties are operating in the search for oil and gas and more than 9000 wildcat tests were drilled in 1949 in this country outside of proven areas, in the hope of finding new deposits. This is the effort that the gas industry must depend upon to find the supply of natural gas for the future. And the gas industry may well benefit by examining the studies of some of the scientists of the petroleum industry as to the prospects for finding additional supplies of oil.

Mr. Terry is vice president, Chase National Bank, New York. His paper was first presented at the 1950 AGA convention, Atlantic City.

TABLE 1. Past Production and Discoveries of Gas and Oil

Total U. S.		Natural Gas	Crude Oil	Ratio
		Trill. Cu Ft	Bill. Bbl	Mcf/Bbl
Produced to	1/1/50	160 (Approx.)	38.9	4.1
Proved Reserves	1/1/50	180[a]	24.6[b]	7.3
Discovered to	1/1/50	340	63.5	5.4

a By AGA committee on natural gas reserves.
b By API committee on petroleum reserves.

The subject of the ultimate supply of petroleum was discussed by Wallace Pratt[1] in 1942 and 1944. Since then, additional territory has been explored, deeper wells have been drilled, new evidence has been revealed, and the ultimate oil and gas resources of the country are believed to be more than could then be counted upon. One of Mr. Pratt's colleagues was Lewis G. Weeks, now senior research geologist for the Standard Oil Co. (N.J.) and presently distinguished lecturer of the American Assn. of Petroleum Geologists, on "Sedimentary Basin Development." For more than 10 years, Mr. Weeks has carried on extensive geologic studies of the deposits, reservoirs, and possible sources of oil throughout the world leading to estimates of the ultimate production of oil in the United States and other countries published by him in 1948[2]. A paper prepared by Mr. Weeks, "Concerning Estimates of Potential Reserves," is to be published in the October 1950 Bulletin of the AAPG. He has been good enough to discuss with the writer the results of his studies and their application to the present problem of future gas potentials.

Weeks' Research

The United States comprises an area of approximately 3 million square miles. Of this total, about 1.5 million square miles, having a volume of 2 million cubic miles, consist of sedimentary formations believed capable of having been source beds for the formation and accumulation of oil and natural gas. Oil and gas deposits of different origin, size, and character occur in various placements among the sedimentary basins of the earth.

Mr. Weeks has given a great deal of thought to the development of yardsticks to be used in comparing or rating areas of potential production and to methods for estimating potential reserves. His methods are based upon the occurrence of oil in relation to the geology of fields and potential fields in the sedimentary basins. He has compared the known fields in relation to sedimentary basins in which they are found, area by area, with the outlying basins that are considered searching ground for new fields throughout the world.

Flaring Blurs Total

From his extensive studies Mr. Weeks has concluded that the crude oil reserves ultimately to be produced in continental United States, excluding tidelands, from formations down to 20,000 ft in depth should approximate 110 billion bbl. Total production had been 38.9 billion bbl to Jan. 1, 1950, when 24.6 billion bbl were estimated to be proved by the American Petroleum Institute committee on petroleum reserves. Based on these premises, 46.5 billion bbl then remained as discoverable in the future.

The quantities of natural gas that have been produced will never be known since large, unmeasured quantities were blown into the air and wasted in the early days. There are good records by the Bureau of Mines of the natural gas marketed in the U. S. since 1905. So far as can be estimated, some 84 trillion cu ft of natural gas has been marketed, about 30 trillion lost and wasted in the natural gas industry, and an enormous but unknown quantity of gas in solution with oil had been wasted in the production of oil, so that total gas produced to 1950 has approximated 150 to 175 trillion cu ft. Past production and discoveries of natural gas and oil are compared in *Table 1*.

Ratio Will Widen

There are reasons for believing that, of the hydrocarbons to be discovered in the future, the ratio of gas to oil will be higher than has occurred to date. Some of the reasons are:

1. The trend of drilling is to deeper and deeper zones so that the reservoir pressures of future discoveries may be expected to be greater than in the past. Since gas is compressed somewhat in proportion to pressure, the quantity, by weight, of gas contained in a cubic foot of pore space is greater with increasing depth. For oil, the reverse is true, since after the oil cools upon reaching the surface and the solution gas is released, the volume of oil is less than it had been in the reservoir.
2. Deposits of oil found at great depths and under correspondingly high pressure contain larger proportions of gas in solution than oil in shallow reservoirs. Of present proved reserves of natural gas, 15% consists of gas in solution in oil and this ratio is likely to increase.
3. A principal future hunting ground for natural gas will be the Gulf Coastal Plain and the tidelands offshore therefrom. It was found by Barton[3] and recently confirmed by Brooks[4] that the hydrocarbons encountered in the tertiary formations of the gulf exhibit progressive change in composition with greater geologic age and depth, the older and deeper oils being of lighter specific gravity and having larger percentages of lighter constituents. Mr. Brooks, who examined oils from 154 fields, shows this to have resulted from contact of the original heavy bitumens with the natural catalysts of the retaining rocks through long geologic time under reservoir temperatures that are higher with increasing depth. Hence, it is likely that the future discoveries in this area at greater depths will contain higher proportions of free gas, since the deeper the deposit, the higher the reservoir temperature and the greater the possibility for more complete transfor-

TABLE 2. Former Estimates of Proved Oil Reserves (In Billions of Barrels)

Former Estimates of Proved Oil Reserves			Produced Since Est. to 12/31/49	Estimated by API Committee 12/31/49	New Reserves Found Since Former Estimate	
Date	Agency					Ratio
1/1/22	AAPG and USGS	5.00	33.04	24.65	52.69	10.5
1/1/25	API Com. of 11	5.32	31.03	24.65	50.36	9.5
1/1/38	API Res. Com.	15.51	18.97	24.65	28.11	1.8

Compare Ratios:

Proved Reserves 12/31/49 Excluding Tidelands		Estimated Future Discoveries		Ratio of Future to Present Est.
Crude Oil	24.6 Bill. Bbl	46.5	Bill. Bbl.	1.9
Natural Gas	180 Trill. Cu Ft	280	Trill. Cu Ft	1.6

mation of the original oil in place with resulting increased formation of gas. From whatever the cause, the fact is that recent drilling of exploratory wells has resulted in increasing proportions of gas wells to oil wells discovered. (See *Table 3.)*

4. The ratio of 4. 1 Mcf/bbl for gas to oil produced to date seems oddly low compared with the 7. 3 Mcf/bbl for presently known reserves. But in the old Appalachian fields where oil and gas have been produced for 90 years, wells were to shallow depths, gas in solution was relatively small and there were few purely gas producing fields. Hence, it is felt that the deeper drilling of the future will produce results nearer to the gas-oil ratio of the presently proved reserves.

Tidelands Exploration

Weeks concludes from geological studies that the crude oil to be discovered in the future will be 46.5 billion bbl for the continental U. S., exclusive of tidelands. For the reasons mentioned, it is felt that the ratio of gas to oil to be found in the future will be at least 6 Mcf/bbl and probably more. At 6 Mcf/bbl assumed as a minimum ratio, multiplied by Weeks' 46.5 billion bbl, approximately 280 trillion cu ft of gas are indicated to be discoverable in the future from the continental lands of the United States.

Oil and gas have been found in great abundance in the near-shore plains and marshes along the Gulf coast of Louisiana and Texas. Offshore, the sea bottom of the continental shelf slopes very gently to seaward and along the Louisiana and southeastern Texas coast the depth does not exceed 60 ft of water as far as 40 miles from shore. There are many oil and gas fields on the Mississippi river delta overlying the continental shelf and demonstrating the existence of oil and gas deposits in the shelf miles to seaward from the normal coastline. In the last three years, much drilling has occurred in these tidelands and to date 12 oil fields and 12 gas fields have been discovered off the Louisiana coast, some as far as 28 miles from shore. And a rich deposit of natural gas has recently been discovered in the Eugene island block, 20 miles offshore from the Louisiana coast where 500 ft of very porous gas-bearing rocks have been encountered at a depth of 11,000 ft.

Big Tidelands Reserve

The offshore wells, drilled from large steel derrick platforms built in the Gulf waters, are very expensive and, while numerous geologic structures have been discovered and await testing, there remain many problems as to the size, thickness and depth of the deposits and depth of water that will warrant development. The thickness of the possible oil and gas containing strata is enormous—it being more than 25,000 ft to the bottom of tertiary formations which are the oil and gas-bearing beds of the coastal area. The area of the continental shelf along the Gulf coast from the Rio Grande to Alabama and within the 60-ft depth line approximates 16,000 square miles.

The potential gas reserve in these tidelands is of a very large order of magnitude, a quantity which cannot yet be approximated. But judging by the known reserves developed to date per 100 square miles in the same geologic strata in the adjacent in-shore lands and the probable future potential thereof, the evidence from wells completed to date in the tidelands and the number of structures already found offshore, it is felt by the writer that the natural gas ultimately to be produced from the Gulf tidelands will exceed 50 trillion cu ft.

From the foregoing reasoning, the minimum quantity of future supply that can be reasonably forecast may be summarized as:

United States	Trill. Cu Ft
Present Proved Reserves	180
Future Discoveries: Lands	280
Tidelands	50
Total Future Supply	510

TABLE 3. Projection of the Trend of Discoveries

Year	No. of Gas Wells to Oil Wells[a, c] Ratio	Average Depth of Wildcats[a, c] Feet	Wildcats Drilled[c]	New Reserves Found[b] OIL Billion Bbl Per Yr.	OIL Billion Bbl Total	GAS Trillion Cu Ft Per Yr.	GAS Trillion Cu Ft Total
Actual							
1938	.255	4,138	2,638	3.05	.....	Data	.....
1939	.217	4,065	2,702	2.40	.....	not	.....
1940	.212	3,858	3,038	1.89	.....	avail-	.....
1941	.209	4,070	3,264	1.97	.....	able	.....
1942	.200	4,388	3,212	1.89	.....	"	.....
1943	.348	4,112	2,843	1.48	.....	"	.....
1944	.332	4,642	4,796	2.07	.....	"	.....
1945	.446	4,532	5,613	2.11	.....	"	.....
1946	.492	4,650	5,752	2.66	.....	17.7	.....
1947	.405	4,475	6,775	2.46	.....	11.0	.....
1948	.332	4,907	8,013	3.80	.....	13.9	.....
1949	.302	4,568	9,058	3.19	.....	12.7	.....
Average last 10 years				**2.35**	.....	.....	.....
Average last 3 years				**3.15**	.....	**12.5**	.....
Estimated (U. S., excl. tideland)							
Next 10 years				2.00	20.0	11.0	110
2nd 10 years				1.30	13.0	7.5	75
3rd 10 years				.75	7.5	5.0	50
4th 10 years				.40	4.0	3.0	30
5th 10 years				.20	2.0	1.5	15
Total 50 years				.....	46.5	.....	280

a Of successful wildcats completed.
b Figures through 1949 by reserve committees of API and AGA.
c Lahee, F. H., Bull. Amer. Assn. Pet. Geol., Vol. 34, (1950), pp. 995-1013.

The reasonableness of the above forecast may be tested by reviewing the subsequent history of prior estimates of proved reserves. In 1921, following a wave of alarm over the apparently dwindling supply of oil, a committee of the American Assn. of Petroleum Geologists, working jointly with the Geological Survey, found 5 billion bbl of known oil reserves as of Jan. 1, 1922. As indicated in *Table 2*, there have been 52 billion bbl of new oil reserves found since that time, a ratio of more than 10 of new oil found to the old estimate.

API Figures Low

The American Petroleum Institute created a famous "committee of eleven" in 1925 to study the problem, and its findings were similarly small as judged by hindsight. Later the American Petroleum Institute organized its present committee on petroleum reserves. The committee's second annual report, issued as of Dec. 31, 1937, showed 15.5 billion bbl of known oil, since which time 28 billion bbl of new reserves have been found—a ratio of new oil to the old estimate of 1.8. Weeks' present estimate of reserves of oil to be discovered in the future of 46.5 billion bbl compared with the presently known reserves of 24.65 billion bbl is equivalent to a

ratio of 1.9, which, in view of the experience following the 1937 estimate, seems reasonable enough.

The present AGA committee on natural gas reserves made its first report as of Dec. 31, 1946, and former estimates by various organizations may not be comparable with those of the committee. However, there is a comparable estimate of the reserves of the Appalachian district made by E. E. Roth as of Dec. 31, 1934. Roth was then and is now chief geologist for the Columbia Gas System and its predecessor, and since the organization of the AGA committee he has been chairman of its subcommittee for the Appalachian district. His 1934 estimate (adjusted to include solution gas) was 6140 billion cu ft. Since 1934 production for the district has been 5940 billion and the AGA committee reports 4410 billion cu ft of reserves as of Dec. 31, 1949, indicating 4210 billion cu ft of new gas found in the interim.

Appalachians Revisited

Oil was discovered in the United States at Titusville, Penn., in 1859, so that by 1934 the Appalachian district had been producing for 75 years and it might have been thought that the search for oil and gas in that area had been practically completed. Even so, new reserves have subsequently been discovered in the area equivalent to 69% of those known in 1934. Although the Appalachian fields have now been producing for 90 years, a number of large gas wells have been discovered this year in Clinton county, Penn., within 90 miles of the 1859 discovery, and total production of the Appalachian district today is still 77% of the alltime high induced by the war demand in 1917. Over half the known reserves of the United States as a whole have been found in the last 10 or 15 years.

The reasonableness of the foregoing estimates of future discoveries may also be tested by the projection of the trend of recent discoveries shown in *Table 3*.

Oil Decline Seen

The estimated futures in *Table 3* follow patterns purposely designed to produce total future discoveries equivalent to Mr. Weeks' estimate for oil and that made hereinbefore for natural gas. Considering the long experience of growth of the oil industry and the rate of new oil found in the last 12 years, it is felt that the decline in new oil to be found, as forecast by decades in *Table 2*, is reasonably rapid and that by this test his estimate of ultimate oil production seems quite conservative. He himself feels that it is more likely that actual future production will ultimately exceed his estimates substantially than that it will be less. The pattern of discovery projected for natural gas also seems quite possible, and from this approach our estimate appears conservative — doubly so in view of its being based upon Mr. Weeks' very conservative estimate of future oil.

The writer discussed this problem of future supply in 1944[5], then venturing to estimate a future production of 300 trillion cu ft *or more*. At that time, the highest estimate of proved gas reserves was 110 trillion cu ft and production was about 4 trillion cu ft per year. Since then, new pipelines have been built, production has risen to 6.25 trillion cu ft for 1949, new fields have been discovered and old fields enlarged, and great strides have been made in offshore drilling. Since 1944, too, the comprehensive system of estimating the nation's gas reserves inaugurated by the AGA committee has revealed a higher level of proved reserves than formerly known. Thus, in the light of new evidence the 1944 estimate of future supply appears to have been entirely too conservative.

Why Predict?

The proved reserves of natural gas are estimated with reasonable precision by the AGA committee. But the total future supply, including the reserves yet to be discovered, cannot be accurately determined. However, if it can be shown that the future supply will be not less than some minimum figure, such reckoning may be useful as a guide to management, consumers and investors. More complete indications of the ultimate quantity of gas to be recoverable will be revealed in due time and provide a basis for revising any estimate made today. But from the present evidence, as reviewed above, it is my judgment that the future recoverable natural gas in this country will exceed 500 trillion cu ft.

ACKNOWLEDGEMENT

For suggestions used in the preparation of this paper, the author is indebted to Lewis G. Weeks, senior research geologist, Standard Oil Co., (N.J.); Benjamin T. Brooks, consulting chemist, New York; Gail F. Moulton, geologist and second vice president, The Chase National Bank; and Ralph E. Davis, consulting engineer, Houston.

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[5]Terry, Lyon F., Proc., Nat. Gas Dept., Amer. Gas Assn., (1944), pp. 133-137.

AGA To Produce Package TV Show

The AGA has become one of the first associations to offer its member companies a packaged television show.

"Food Is Fun," a series of half-hour home economics films bringing a distinctive television show within the reach of practically every gas utility, was presented to a group of several hundred persons, including many leaders of the industry, at the AGA convention in Atlantic City.

Credit was given to *GAS* for having played a large part in stimulating development of this association television program through a survey of the television situation and comments in editorial columns, by H. E. Eckes of The East Ohio Gas Co., chairman of the AGA's television committee.

The show features Louise Winslow, "one of television's brightest home economics stars," who has been on video for East Ohio for many months. In all films Miss Winslow will tell a general story of the benefits of gas equipment as she goes along in the show. In each 30-minute show a total of two minutes is provided for commercial messages by local gas companies. This time may be used in three places in the show and local messages may be prepared in any way the gas companies choose.

Frank Smith, chairman of the general promotional-planning committee of the AGA, told the audience details of the project. The television committee, in addition to Mr. Eckes, includes D. W. Reeves, Oklahoma Natural Gas Co., Tulsa, and C. Fred Westin, Public Service Electric & Gas Co., Newark. The television committee was assisted by the television advisory committee of home service directors: Mildred Clark, Oklahoma Natural; Mary Huck, The Ohio Fuel Gas Co., Columbus; Isabel McGovern, Minneapolis Gas Co.; Gladys Price, Southern California Gas Co., Los Angeles; Ruth Soule, The Brooklyn Union Gas Co.; and Jessie McQueen, AGA home service counsellor.

It is planned to circulate television prints to local sponsors on a rental basis. Following established practice, rental costs will show a weighted relationship to the number of TV sets in each market.

If there should be only 20 television sponsors (the minimum number required immediately to justify production of the series) approximate rental charge per film would range from $120 for a market with 20,000 sets or less as of Sept. 11, 1950 to $240 for a market with over 500,000 TV sets.

However, with 30 sponsors, the approximate film rental charge per film would be $90 for the 20,000-or-less market and would range up to $195 for the over-500,000 market.

The minimum rental order for television should cover 13 films to be used over the same number of weeks.

Full color Kodachrome prints of any film in the series also can be purchased for screen projection.

Inquiries should be addressed to H. Vinton Potter at AGA.

TV Techniques

As gasmen make ready to launch an industry-wide selling effort on television, the star of East Ohio's "Through the Kitchen Window" points up the musts for an effective show.

By LOUISE WINSLOW

THE television industry is a rapidly changing one, and one that is full of repetition, contradiction, reversal and impossibility. Home economics in television inherits all these problems and carries in a few of its own unique ones. So, the home economist before the television cameras begins with the complications of an industry concerned with things far removed from such thoughts as, for example, which pastry method is to be used. Therefore, the home economist separates her thinking from her recipe books, her laundry method guide, her dressmaking instructions; and she looks first of all at the medium through which she is going to be sharing her professional training.

Maybe the ramifications of the job loom rather large, but in the constantly changing activity of television she will find its charm and challenge. In order to solve all the problems the home economist will encounter, one should be a combination engineer, critic, writer, director — and all with plenty of years for study, experimentation, and development.

During my three years in television, many people have given me a boost along and in the following points, I'll attempt to share with you their help. In working in television you may find this a helpful procedure:

1. Establish your purpose
2. Plan your show
3. Try it out
4. See it on the camera
5. Plan for the unexpected
6. Be willing to change

Determine the type of show you are going to do; find out what it is to accomplish. Are you selling a range? Then you will plan foods which best show the features of that particular range, and you will know that foods cooked on top of the range do not always convince the viewer that "Gas Has Got It!" unless they are the foods which prove the effectiveness of the flexible heat, the simmer burner, the instant heat. Will you be selling this same range over a period of weeks? If so, it would be wise to schedule the demonstration of various features so that none is omitted and all receive adequate stress.

Pat the Jacket

Are you selling a water heater? If so, you may stand still and deliver the best written copy in the world without accomplishing a fraction of the results you'll get by patting the "gleaming white jacket that covers the thick blanket of insulation" or by pointing out the big burner that heats the whole tank and concluding the whole commercial with the figures on low cost of heating water with gas. Remember that the heater can't speak for itself—speak-

Miss Winslow is television home economist, East Ohio Gas Co., Cleveland. She is the star of the AGA packaged TV show to be distributed to utilities (see col. 3, page 32).

on its behalf is your purpose; and if you've sold yourself, you can sell others. You need to know and understand the features of every appliance, then show them to the viewers just as you would want to be shown.

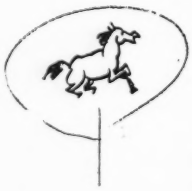
Is your sponsor selling gas incinerators? Then, help him out with flip cards contrasting the burning basket of rubbish with the neat, orderly appearance of a modern gas incinerator. Often in your cooking show, mention the disposal of refuse the effortless gas-incinerator way. Let the viewer see that the unit is part of your life, something you use, not just advertise.

Possibly your purpose is to convey the idea that doing it with gas is the modern way, whether it may be refrigeration of foods in a noisless gas refrigerator or drying clothes in the gas dryer. In any case, your audience will be with you in your logic when you open the door of that refrigerator, take out fresh, crisp greens, a juicy roast, appetizing left-overs. The viewer can't hear it being noiseless, but she can see the results of efficient refrigeration and the savings made possible thereby. Frequently a word-picture about the handicaps of hanging out the heavy wet clothes, stretching an unwieldy line, and trying to outguess a rain storm will carry your viewer right to your side as you open the door of a gas dryer and take out the clothes damp-dry for ironing and return later to take out the fluff-dried bath mat. Maybe your viewer hasn't been shown that one dryer can do several things all at once. If you're selling gas, you're selling service and information, too.

How to Sell Gas

Which brings us to the home economist whose purpose in television is to sell gas, the commodity. We have experimented a long time to make the gas flame visible, but with the bright lights of the set, the camera misses that wonderful blue flame, and unless we realize that we are dealing in intangibles, we miss it, too. There is just so much that we can offer to the public in connection with the romance of the gas industry, just so much of the technical side that our audience will grasp. From there on, it becomes the presentation and demonstration of what gas will do in the viewer's home. We must prove it dependable. We must demonstrate its flexibility and cleanliness. We must follow up on the claims we make for it in contrast to any other fuel. We must adapt our very vocabulary to the words which best convey our story. We regulate the flame, we bake in a gas oven, we store food in a gas refrigerator, we broil so many inches from the flame, we turn off the gas, we set the temperature control of our gas water heater, we cook with gas, we dry clothes with gas, we like the clean gas flame, the smokeless gas broiling, the removable gas burners.

One last thought on establishing your purpose. Don't be an ostrich and bury your head too deeply to realize that your competitor has a purpose, too. Maybe your very best job wil lresult from a study of the methods and arguments on the other side of the picture.



Now that you have established your purpose and you know what to expect from your television show, you are ready to plan it. You will need to decide if it is to be straight demonstrations, with you in the role of teacher. Or is there a story line, where you invite the viewers into your home and have them "live with you?" The straight demonstration has much in its favor when it comes to a commercial show, for it is ready to bring in plugs for unrelated advertisers. Many products, appliances, and services naturally conform well to this type of show. It may border on the deadly, though, if the demonstrator talks down to the audience or lacks the human touches which can take the tedium out of any lecture-demonstration.

The show with a story line is fun to do, but it must be logical and often poses the problem of explaining people who suddenly appear, and one can easily spend too much time on a fiction which would be better directed at fact. We have tried a comic relief on a night-time homemaking show which successfully brought in men viewers. We have experimented with guests, specialists in the field, authorities from the manufacturers and interesting personalities from unrelated fields, all with results depending on the quality of the personality of the guest and his ability to express himself. A charming band conductor made stirring Chicken Belmont a thing of great skill, while a stunning interior decorator froze into a no-and-yes automaton whose eyes never left the floor.

But whatever form your show is to take, it must have an opening and a closing. One cannot loom suddenly up on the screen in the viewer's home, nor can one abruptly dissolve into a title card. These take planning and much thought. And remember, the opening sells the show long before you appear to sell gas ranges; just as the closing remains in the viewer's mind after you have finished your last plug for the gas heater.

As you plan the content of your show, map out several shows, whether for a week, a month, or the 13 weeks usually signed by a sponsor. Keep continuity in your shows by spacing the commercials properly, varying the menus used, changing your costumes, scheduling guests far enough apart to maintain the character of your original format.

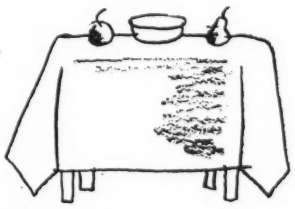
As you plan the individual show, make up a list of props you'll need. Plan enough for the duplications required by rehearsals. And keep these lists in a book, not on slips of paper which you've left in your brown bag the day you're wearing navy blue.

When you decide on content to carry your needed sales points, try to have it easily staged as well. Keep moving about the set to a minimum; but when you are selling good kitchen arrangement, don't stand glued to one spot and let your efficient floor plan go unseen. Keep viewer interest keen by not staying too long in one spot—you know how much more pleasant a moving picture is to watch than a series of slide films; so, keep your movements fluid and easy. But keep them so uncomplicated that when you are required to run through them eight or nine times you will still be sure of stage left.

Plan the show with an eye on the clock; in fact, once you enter the doors of television, you will always have one eye right on the second hand. Make it easy for yourself by selecting content which is smoothly timed and which will give you a few minutes' leeway.

At first, select dishes which you can speed up or slow down in preparation. The most difficult show I ever did was to prepare a whole meal from frozen foods in 15 minutes, having told the audience that was what I would do. It was done, but next time I'd plan foods which would take me 13 minutes in the privacy of my own kitchen. Somehow, the clocks in television studios have a way of snatching minutes away from our programs as the medium itself snips years off our lives. But tyrants that they are, you must have one, a big clock, clearly visible to you from all points of your studio, which probably means hung on the center camera.

You have now progressed through the first two stages of putting on a television show. Now you are ready for the third: try it out. After the outline or script is written, try it out, first at home, but by all means, try it out. If you have walked through even the most simple show, you won't mind being called into the producer's office, or up to the sales department of the station and being told to "do a walk-through." You won't mind at all, because you can pat the desk and tell them, "this is a kitchen table," the chair "a gas range," the file case "the gas regrigerator" and so on, until you are ready to scramble eggs



(which they can't see) on top of the chair (which they can see, but which you tell them is a gas range); and you won't mind at all, because they will all know what you mean.

Try it out for movement, and try it out for size. Since you won't have a camera to play with at home, use three mirrors of different sizes to acquaint yourself with the difference in pictures the various lenses will give you. Find out how short a reach you are allowed with a close-up on an 8-in. See the loss of detail when you have a long shot to show the whole set. Remember, too, that varied shots will keep viewer interest, and space the close-ups interestingly.

When you're trying it out, remember what you learned in freshman art about perspective and composition. Do you know that a loaf of luncheon meat, a tomato and six slices of cheese can keep an art director, a television director and a producer engrossed for a solid hour, just by changing their positions on a wooden board?

In the try-out, too, don't lose sight of the fact that you now, and if we may believe current reports, for some time to come, are working in shades of grey. No colored television for us yet; so we fight the battle of intensity, values, lights and darks, which makes size and shape of paramount importance. Look at a newspaper picture of a salad and compare it with the same actual salad beside it. But even that limitation isn't too great. Just buy yourself a set of vegetable colors and teach your crew that a sponge cake with green filling is just as good as bright red peaches and blue orange sections. White pastry is lost on a white pastry cloth, so you dye the cloth green.

In this connection, I suggest you color food only as a last resort, for much can be done to set it off with the right color dishes and accessories. But brown gravy looks much more real with some Kitchen Bouquet smuggled in, and a drop of yellow in the milk for the cream sauce lifts creamed tuna out of the rejected. But big chunks of tuna improve the dish even more, just as peach halves take notice of banana sections and droop over sliced ones.

Our fourth step is to see it on camera. By fair means or foul, cajol your station into giving you a monitor on which you can see the shots of your show during rehearsal. Maybe all the foregoing steps have missed some point which now appears as a glaring impossibility. Check your shades of grey, your composition of each dish, the set, displays. Work with the lighting expert on highlights, be ready to change angles, move a bit to the left or right, and then mark the place with yellow chalk for the next time.

Camera positions are often marked on the floor and possibly marks will be made for your feet in various parts of the show. This helps the remembering department, but once in a while encourages one to walk with eyes on the floor until the next mark is reached. The monitor has an attraction for eyes, too, and during the show, it is rather disconcerting to see the eyes of the per-

former wander to an unseen spot and then blur, as when one studies himself in the mirror.

You are ready for the air now, you think, but really you will find the fifth step very important. It is to plan for the unexpected. If a spoon is missing from a tray, have one accessible in a drawer of your demonstration table. If your range needs attention, see that it is checked well before air time. If you get frosting on your fingers, have a towel, one end wet, where you can easily reach it. If you spill on the range top, have a cloth ready to wipe it up and turn it into a commercial.

Now, you've established the purpose of your show, you've planned it carefully, you've tried it out dry run and on camera, you've planned for the unexpected; but you aren't ready even yet for the cue, "You're on!" You won't be ready until you've reached the sixth and final step—be willing to change, not only your mind, your hair-do, your props, but possibly your entire show.

No one knows everything about television, and change is the charm and challenge of it all. That's true, and no matter how we plan a show, rehearse it and even put it on the air, there's always a better way. That's why, on the big network shows where we are just one of a cast of 40 and we rehearse for three days, even after we're on the air we get changes from the producer. That's why, too, on our local shows, when it's sewing day and we've rehearsed the sewing show, and an hour before air time the station manager says, "You cook today," we cook. We have no props for a cooking show, but we cook. We cook just like a housewife does when company comes and she races out to see what she can find on the shelf to protect her reputation as a good hostess. We cook under duress, because we're not set up to cook; but the show goes on and a month later somebody says. "You know, the best show you ever did was that one where you pretended you were a housewife with unexpected company—that certainly was clever . . ."

You meet the challenge of change because television won't let you take yourself too seriously. The hours you spent in demonstration techniques stand by you but no longer enslave you. Your cook books become just that and are no longer your Bible. Food still has vitamins, but suddenly it has size and shape you've never seen before.

You're in a whole new world where "take one, take two" is your favorite tune, cigarettes march, and the gas flame dances. You're in show business, and there's no business like it.

Selecting a Natural Gas Odorant—

By J. S. Powell

PART 2

How much odorization is adequate? is the principal question Mr. Powell places under consideration in this second and concluding installment.

Briefly considering the odor requirements of an odorant, the author establishes an odor intensity standard, then shows how laboratory tests can determine the proper rate of odorization necessary to meet this standard.

This rate must then be confirmed by a field testing program, which he describes.

In the first part of this article, published on pp. 53-55 in October GAS, Mr. Powell gave a comparative study of the various types of odorants available on the market, from a standpoint of their properties —stability, corrosivity, effect on appliances, and volatility.

This presentation is adapted from a paper presented at the Pacific Coast Gas Assn. 1950 technical services conference in San Diego.

THE concentration of an odorant in air to just produce a perceptible odor is referred to as the threshold concentration. It is desirable that an odorant have a low threshold concentration so that the quantity to be transported, stored, and injected into the gas will be small in order to minimize operational and facility costs. Also material costs are likely to be lower the lower the threshold concentration.

In addition to a low threshold concentration an odorant should have a characteristic odor not likely to be confused with other odors commonly prevalent in a dwelling. Also the odor should not be pleasant since such an odor may be tolerated without resulting in any action being taken to stop gas leakage or the awareness of a pleasant odor may not be as great as an unpleasant odor in competition with other influences. Neither should an odorant have an odor which is highly obnoxious since the release of gas from an appliance before it is ignited will momentarily subject the customer to the gas odor which will be annoying if it is highly objectionable.

Generally the sulfur compounds in the commercial odorants meet the above requirements. The types of odorants which tend to border on the side of being too obnoxious are those of the mercaptan type and especially if the odorant consists of a mercaptan lower in molecular weight than butyl mercaptan. In the homologous series of mercaptans methyl mercaptan has the most offensive odor, and the higher the molecular weight of a mercaptan the less offensive is its odor.

In selecting the rate at which a natural gas should be odorized, the objectives are twofold. *First*, the gas should have sufficient odor so that under any conditions it would not be possible for gas leaking in a dwelling to build up to an explosive concentration without a person, subjected to the gas, being aware of its odor. *Second*, the gas should not have so much odor that the very small amount of gas that sometimes leaks from piping connections, which is too small to be detected and stopped, and the gas which is discharged from appliances during the period of delayed ignition, will produce an odor in a dwelling of which the customer will be aware. If this latter is the case, service costs compared to when the gas is not over-odorized will be abnormally high because of a larger number of leak complaints and a longer time required to find leaks. Also, the customer will be subjected to annoyance and inconvenience which may well be used as an argument by competitors as a disadvantage in using natural gas.

Difference of Opinion

The basis for determining when a gas is adequately odorized is controversial. It is believed by some that the gas should have sufficient odor so that if a gas leaks within an enclosure which people do not frequently occupy, such as between walls, in attics, or basements, its presence will be noticed in other rooms of the dwelling by the diffusion of the gas through cracks into these rooms before the gas can reach an explosive concentration within the enclosure. Others believe that such a stand would require the gas to be over odorized with its attendant disadvantages, and therefore contend that the odorization rate should be only sufficient to give a warning of the presence of gas in an occupied room before it reaches an explosive concentration. The author is of this latter opinion, and the discussion which follows will be on the method to be used in the determination of the odorization rate in this case.

The most hazardous situation exists when an occupant of a dwelling is present at the time gas leakage commences. If the gas does not contain sufficient odor and the gas is leaking into a dwelling at a rate which will eventually produce an explosive concentration, the occupant will adapt himself to the gas odor as rapidly as it increases in intensity and will therefore never be aware of the presence of the gas[3]. Obviously it is therefore necessary that the odor intensity increase at a greater rate than the rate at which the occupant is fatiguing to the odor when the gas leakage rate is such as to eventually produce an explosive concentration. Of course if the odor of the gas is apparent to the occupant, it will be very apparent to a person entering the room.

In order to build up an explosive concentration of gas in a dweling, the leakage rate has to be at least as great as the rate at which the gas would be dissipated at the explosive concentration by the air change within the dwell-

ing which occurs through openings to the outside. Experimentally, it has been found that at a rate of gas leakage equal to 1.5% of the volume of a room per hour the concentration of gas within the room will not reach the lower explosive limit of natural gas which is about 5% by volume. At a leakage rate of ⅓% of the volume of the room per hour the concentration of gas will not go above 1%. These data are for a closed room containing two doors and windows with one of the doors and the windows in two outside walls and with wind conditions outside the room varying from no wind to a slight wind.

To make an allowance for the variation in the rate of air change for different dwellings and under different climatic conditions and for the variation in the odor perception sensitivity of different people, it is believed that a gas to be sufficiently odorized should be detectable to an occupant in a room of a dwelling when the gas leakage rate is ⅓% of the volume of the room per hour.

Determining Odorization Rate

Preparation of a Standard Sample of Odorized Nitrogen: Referring to *Fig. 1*, place in the odorant evaporation flask an accurately weighed quantity of the odorant to be tested (from 0.1 to 0.3 grams depending on the odorant's odor intensity). Pass nitrogen or any other odorless gas with a low oxygen content through the flask into an evacuated, clean dry stainless steel container with a cubic foot or more of known capacity and a working pressure of 150 psig. After the container has been about half filled with gas, place the flask in a warm water bath, and fill the container to atmospheric pressure. Then connect the container directly to the source of nitrogen and pressurize it to 150 psig. Mix the odorant and nitrogen by allowing the container to stand on either end for an hour at a time for several hours. Calculate the weight of odorant in the nitrogen per cubic foot at standard conditions.

Determination of Lowest Concentration of Odorant Perceptible by Odor: Select a test room with a volume of from 1000 to 1500 cu ft. Referring to *Fig. 2* assemble the apparatus shown for injecting the standard odorized nitrogen into the test room at any desired rate. By means of this apparatus the odorized nitrogen from the container can be diluted to any desired known degree (probably as much as 200 times with some odorants) with air and the odorized nitrogen-air mixture discharged at a constant rate through the discharge orifice which is located in the test room; the excess mixture vents to the outside from the top of the pressure regulator. Size the orifice so that it will discharge the odorized air at the rate of ⅓% of the volume of the room per hour.

Select six observers preferably not associated with odorant testing. Have these observers enter the test room and instruct them to mentally observe without discussing their observations with the other observers the time to the nearest minute on a large-faced clock in the room when they first become aware of the presence of an odor. During the time that the test is in progress, it is desirable to have the observers occupy their time by reading, talking, playing cards, etc.

With the observers in the test room and air only passing through the discharge orifice, wait five to ten minutes (time observed to the nearest minute), and then inject the standard odorized nitrogen into the air stream at a rate to give a concentration of odorant in the air-nitrogen mixture equal to that specified by the manufacturer for natural gas odorization. Continue the injection for a period of 10 minutes. At the end of this time have the observers record the time when the presence of an odor was first noted and the nature of the odor.

For the odorant to be in high enough concentration in the odorized air, all of the observers should have unquestionably detected the presence of an odor in the room within six minutes after the odorant was injected. Usually it will be found that if the odorant concentration is sufficient the majority of the observers will detect the odor in about three minutes. If the time goes beyond six minutes and still some observers have not detected the odor, it indicates that the rate of increase of odorant concentration in the room is so gradual that the observers are adapting themselves to the odor and will never detect it regardless of how long the odorant injection is continued.

If the odorant concentration first tested is ample or too low, make several other tests at different concentrations either above or below this concentration, as the case may be, to establish that which is just sufficient. Allow about one half hour between tests with the windows and doors open in the room for the room to become well aerated and the observers to recover from odor fatigue. The odorant concentration thus established is the concentration adequate for natural gas odorization.

Using the procedure above the odorization rates of the several different types of commercial odorants were determined. The rates obtained are given in *Table 2* and for comparison the rates which are recommended by the manufacturer or are normally used. It will be noted that generally the rate determined is higher than that normally used. Only one series of tests was made with one group of observers on each of the odorants; therefore, how close these odorization rates could be reproduced with the same group or different groups of observers is not known.

TABLE 2. ADEQUATE RATES OF ODORIZATION OF NATURAL GAS WITH VARIOUS TYPES OF ODORANTS

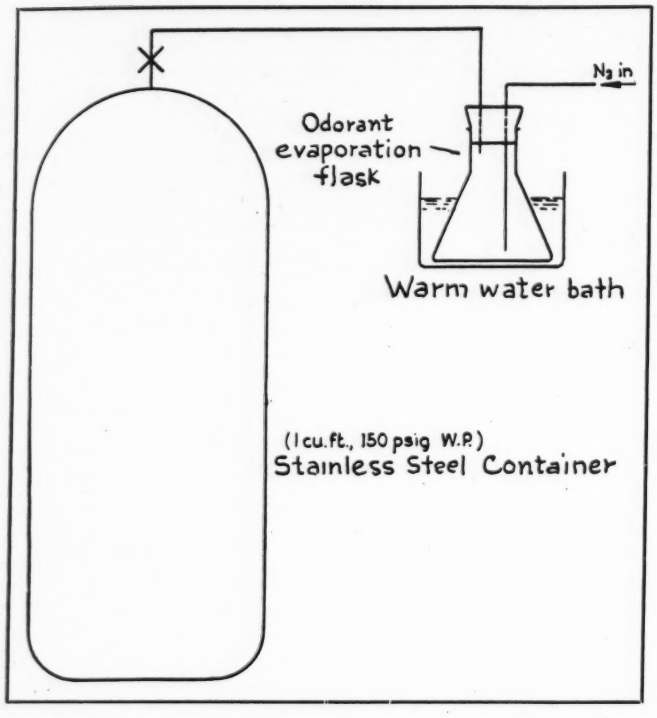
Odorant Designation	Type	Odorization Rate Determined lbs/MMcf	Odorization Rate Normally Recommended lbs/MMcf	Odor Similarity
A	Mercaptan	1.2	0.75	Oil refinery
B	Mercaptan	1.3	0.75	Oil refinery
C	Thioether	5.4	.....	Oil refinery
D	Thioether	10.5	1.0	Oil refinery
E	Carbon-sulfur ring	1.1	0.5	Oil refinery
F	Thioether, disulfide, and carbon-sulfur ring mixture	7.4	13.0	Oil refinery

Sulfur is Safe

The odorant in odorized gas should not be harmful in any way to a person exposed to a concentration of the odorant which might accumulate as the result of gas leakage. All of the sulfur odorants easily meet this requirement. The only physiological effects these odorants produce in the concentrations involved is an odor and a slight eye irritation in some instances.

It is also necessary that products of combustion of the odorant in odorized gas have no physiological effect whatsoever in the concentration to which a person would be exposed. All of the sulfur odorants combust to form carbon dioxide, sulfur dioxide, sulfur trioxide, and water vapor. The only products of physiological significance are sulfur dioxide and sulfur trioxide. Taking the case of the gas odorized as recommended with the odorant adding the most sulfur, the combustion of this gas will produce flue products containing a maximum of 0.6 ppm of sulfur dioxide and sulfur trioxide. This concentration is well below that which has any physiological effect such as irritation, odor, or toxication[4].

After the most satisfactory odorant



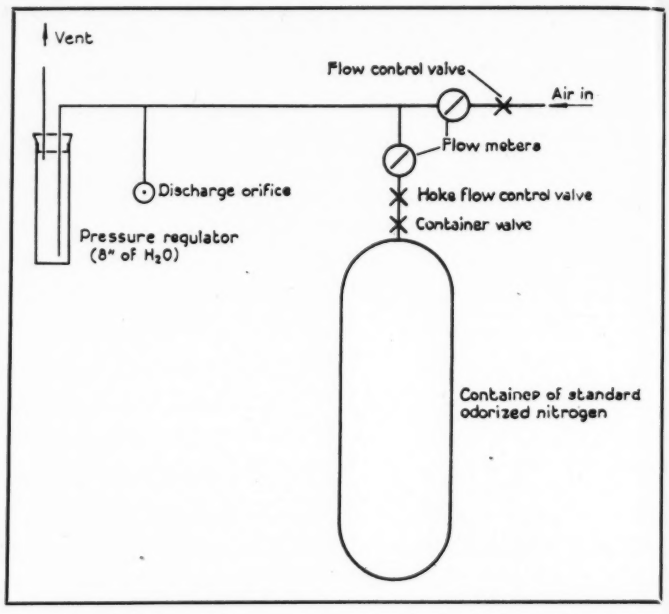


Fig. 1. Apparatus for preparing standard odorized nitrogen.

Fig. 2. (Above) Apparatus for injecting odorant into test room at controlled rate.

has been selected on the basis of laboratory tests and other information, it is desirable to obtain confirmation of its suitability by using it to odorize gas distributed to a small town or district in the system. The area to be used for test should have enough customers to obtain a statistically accurate evaluation, and these customers should represent the most critical in the system. Preferably make the test during the cold time of the year. The length of the test should be at least one month and for the analysis do not consider the leak and odor complaints during the first of the month but only after the complaint rate reaches a fairly constant level.

Checking Diffusion

To determine if the odorant reaches all parts of the test area in the same concentration and state as at the point of injection into the gas, analyze the gas for odorant at various locations in the area. If the odorant consists of the stable thioether or carbon-sulfur ring type of compounds, the total sulfur in the gas can be determined and from it the odorant concentration calculated. Fogo and Popowsky[5] have published a suitable method for chemically determining the total sulfur in natural gas, and the Consolidated Engineering Corp., Pasadena, Calif., manufactures an instrument which will continually give a record of the concentration of a stable sulfur odorant in natural gas providing the instrument is calibrated for the odorant[6].

If the odorant is of the mercaptan or disulfide type, as mentioned previously, it may undergo chemical change. With these types of odorants the gas should be analyzed for both total sulfur and specifically for mercaptan sulfur. Shaw[7] has published a method for determining mercaptan sulfur. From the results of these two analyses the degree of the chemical change of the odorant at any point in the system can be calculated.

Complete reliance should not be placed on the degree of odor intensity of the gas indicated by odorant analyses; for additional substantiation the odor level of the gas can be determined at various locations in the system by means of an odorometer. A type of odorometer which can be used consists essentially of an electrically driven air blower discharging into the apex of a funnel shaped vessel constructed of stainless steel and with an opening of about 100 square inches. A rotameter and control valve are provided so that the gas to be tested can be injected into the air stream to the funnel at any desired rate.

Using Odorometers

To make a test with the odorometer, odorized gas is injected into the air stream from the blower at a rate so that the odorant in the air will be below the threshold concentration. Incrementally the gas injection rate is increased, and at each rate the observer places his face over the funnel and smells the air for odor. The rate of gas injection at which an odor is just perceived is a measure of the odor level of the gas. The base rate established for the gas taken from the pipeline close to the point of odorization represents 100% odor intensity. At any other location in the system, the per cent odor intensity of the gas will be given by the base injection rate divided by the rate at the test location multiplied by 100.

The odorometer should be used outside, and between each incremental increase in the gas injection rate, the observer should breathe fresh air for several minutes to prevent odor adaptation. Also, all tests including the establishment of the base injection rate should be made by the same person since people differ in their sensitivity to odor perceptibility.

Verify the adequacy of the odorization rate by conducting several closed room tests in the test area. Make these tests in the same manner as previously described, but determine the rate of leakage of the odorized gas into a room to give a detectable odor. This rate of leakage should be 1/3% of the volume of the room per hour.

If the rate of odorization is adequate to give ample warning in the case of dangerous gas leakage, the customers do not react adversely to the odor of the gas, and the leak complaint rate is no more than six[1] per 1000 meters per month, it can be considered that the nature of the odor of the odorant and the odorization rate are satisfactory.

Acknowledgment

The author wishes to acknowledge the assistance of F. V. Wilby in conducting the odorization rate tests and for contributing many helpful suggestions and ideas.

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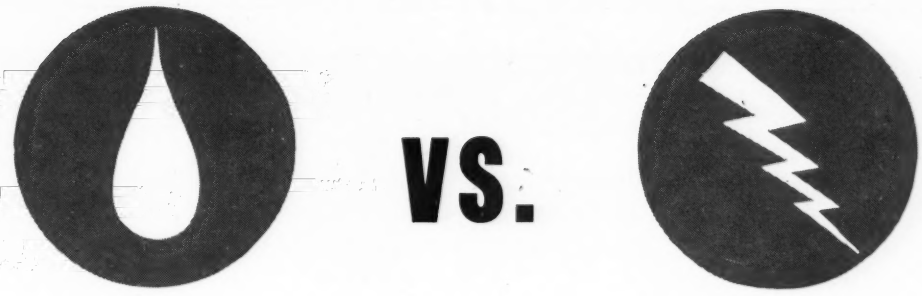


GAS VS. ELECTRICITY is plaguing gasmen throughout the U. S. today, and electric range shipments are on a wide upswing. How to prove gas' superiority for cooking is a "must" problem, but it can be done—conclusively. Here are the ways to do it.

IN September, GAMA's statistical department reported that the volume of shipments of gas ranges was 1.5 to 1 for electric.

Shipments mean sales. And 1.5-to-1 means gas is fast losing one of its most fundamental loads to the competition.

Why?

Is electric cooking faster? Is it cheaper? Is it more efficient? Does it shrink meat more slowly? Does it waste less fat, is it cooler, is it cheaper to buy, does it require less repairs, is it cheaper to install?

The answer to all those questions is the same: "No." But if the word "gas" were substituted for "electricity" in the above, the answer in most cases would be "Yes." In a few, it would properly be "no difference."

That's no idle boast. In every case, the statements can be, and have been, proved. Just how is shown in summary on these pages. Many of the data are of recent origin, and the demonstrations are new and bright. They go over big with any audience.

Now that we have such proof, what are we going to do about it? Sit on it? Probably — if the lessons of history mean anything.

Is the electric industry sitting on its claims of superiority, which are only unsupportable allegations? Indeed not. Are these claims going over? Indeed they are. Try a little test on your friends to see if they believe electric advertising (we're sure you have).

This is not news to any gasman. Nor is it news that, public-relations-wise—and, concomitantly, publicity-wise and advertising-wise — the gas industry is still running second to its competition. Nearly every gas executive at one conference or another these days says so; it must be true.

The gas cooking load has been the prime target for a well-heeled campaign that uses half-truths and implications beautifully. The gas industry need not use the same tools—but it *can* adopt some of the same techniques. In addition to its advertising, the competition successfully exploits two techniques—publications and demonstrations. Just now, the gas industry is developing some excellent ones itself. Several have come to our attention, and in this presentation we're passing them along.

> "I wonder how many of us in the gas industry, which includes gas appliance manufacturers, dealers in commercial equipment, and gas utility salesmen, know what the facts really are regarding the economy of commercial gas cooking over commercial electric cooking? How are we using the facts we already know? Do we know electric rates in our respective areas and can we figure them after we have the rates? Do we know how to figure demand charges? Can we convert gas Btu's to electric Btu's? Can we effectively use proven efficiency ratio factors? And most of all, can we take the answers to these questions, proving the superiority of gas and its economy, and express them in terms a restaurant operator can understand?"
>
> **J. M. LYNN**
> **New Business Manager**
> **Lone Star Gas Co.**

Among publications, we have seen Harper-Wyman's pamphlet titled, "With Center-Simmer Burners, *Nothing Equals Gas* for Range Top Cooking." Caloric Stove Corp. has published a brochure describing, in brief, the gas-vs.-electricity demonstration the company has developed. Harper-Wyman, emphasizing its center-simmer feature, has published another booklet, "How to Sell More Gas Ranges," as well as a comparative cost study. AGA has a folder which simulates a newspaper, with the banner head blaring "Latest News About Meat Shrinkage." Lone Star Gas Co., Dallas, has developed a report based on tests made at Southern Methodist University, showing the tremendous cost savings to be realized with commercial gas cookery. (See p. 42.)

There are, no doubt, many others.

Demonstrations are being developed in many locales. Last year, Southern Counties Gas Co., Los Angeles, devised a show that was put on for employees and dealers. Down in Dallas, salessharp Chester L. May, vice president of Lone Star Gas Co., has been using a big board with 272 50-watt light bulbs to prove the high cost of electric cooking. New Business Manager J. M. Lynn has been telling the results of the SMU studies to restaurant men. D. W. Reeves, recently of Oklahoma Natural Gas Co., Tulsa, has adapted some of Mr. Lynn's SMU cooking data for salesmen's use.

The biggest show of all has been the one put on in Washington, titled "Mr. Flameless and Mrs. Flame." It was produced as a hard-hitting answer to an electric range manufacturer's road show, which chose Washington as one of the mainline stops for its bitterly anti-gas demonstrations. Washington Gas Light Co. countered with its own skit, which played to a capacity audience at a restaurant association conference. It was good enough for a command performance at the AGA convention last month. *Excerpts from it appear on the following two pages.*

"Mr. Flameless and Mrs. Flame" demonstrates seven* basic points—speed, cost, controllability, safety, cleanliness, coolness, and profit-making ability. Let's consider these points, one by one—facts and proofs—as debated in available material. (Here, we'll omit mention of demonstrations included in "Mr. Flameless and Mrs. Flame.") We'll show how they can be demonstrated.

Speed. Comparatively, the advantages of gas are easily proved. J. M. Lynn Jr. used this device when speaking to Dallas restaurateurs:

With domestic electric and gas ranges set

(Continued on Page 43)

*Actually eight, according to the original script. "Familiar and accepted" is an advantage not considered here.

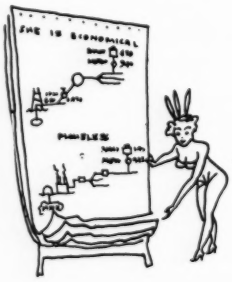
Mr. Flameless vs. Mrs. Flame

This demonstration was put on befor a packed audience in Atlantic City last month. The narrator, Mr. Flameless, was F. A. Kaiser, vice president, Detroit-Michigan Stove Co. Miss Flame was silent, but decorative. The skit was presented at the AGA convention following a showing in Washington, D.C. The following is an adaptation from Mr. Kaiser's script.

WE would like to start this discussion by pointing out certain facts. We shall deal *exclusively* with facts.

Number One—Mrs. Flame. She's economical and yet she's very generous and I would like to show you our first diagram. Here we have 1000 units of heat leaving the well and 1000 units of heat coming to the distribution system in your city or in other cities using natural gas. Of that 1000 heat units 940 find their way to the meter in your establishment; 470 go into your cooking appliance for the actual cooking of the food.

Now let's look at Mr. Flameless. We'll take 1000 heat units of coal in the mine; we transform this fuel to a flameless type of fuel. After this transformation has taken place, this 1000 heat units becomes 242 heat units and of these 242 heat units, 222 find their way to the meter; and of the 222, 140 of them are used in the actual cooking of food. With Flame, 470 of the 1000 original heat units are used in the preparation of food. This is a ratio of 47% efficiency. With Flameless, 140 heat units are used in the actual preparation of the food, an efficiency of 14%. The ratio between the fuels, 470 to 140, is 3⅓ to 1. And peculiarly, 3⅓ to 1 is practically the same ratio which applies to the cost of the two fuels.



Typical Costs

I would like to show you the second diagram in which we will show you the typical monthly operating cost and the appliance cost of the fuels taken from actual tests conducted in various parts of the country. Operating cost is $15 per month for Mrs. Flame and $55 a month for Mr. Flameless. In the case of a broiler it's $10 against $28, oven $12 to $26, and fryer $10 to $24. In all of those cases you will notice that it runs approximately 3 to 1. Original cost for a range is $351 for Mrs. Flame and $714 for Mr. Flameless. For a broiler it's $356 for Mrs. Flame, $646 for Mr. Flameless. That goes for the oven and it goes for the fryer also.

Now I would like to show you another diagram showing the typical operating cost of a restaurant which has two ranges, two broilers, one oven and one fryer. Using the same cost figures which I showed you on the chart before, the cost here is $30 for the two ranges against $110, $20 to $56, $12 to $26, $10 to $24. The appliance figures of course are just the same as they were on the other sheet, doubled in the case of two appliances. The total operating cost of these six appliances in the case of Mrs. Flame is $72 per month and if you don't have Mrs. Flame, your operating cost is $216. And that's a cost ratio of 3 to 1 in favor of Mrs. Flame. The appliance costs are $25.11 to $42.44 or 1⅔ to 1. These figures are confirmed by experience in a Washington restaurant where tests were made on both types of fuel and the actual ratio of cost was 3.6 for Mr. Flameless against 1 for Mrs. Flame.

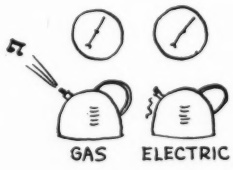
Mrs. Flame is more economical.

The second important feautre is controllability, and we would like to show you here that Mrs. Flame is more controllable than any other type of fuel. We have set up here on the stage two typical counter appliances, both standard makes, one using flame and one using flameless. We take these two teakettles, both empty, put equal amounts of water of identical temperature in each, and place them on the burners. We have two clocks here, one to time the flame and the other to time the flameless.

Now we have turned on both appliances. You will notice that when the whistling starts we will get an indication that the water has started to boil in one of the two kettles.

I hear a faint whistle. Let's get a good shrill whistle out of it. (Pause) There we are — and it just took us one minute and 52 seconds to bring the kettle to a whistling point with Mrs. Flame.

(Another pause.)



We're starting to get a slight sizzle here but we'll do the same as we did with the flame: let it come to a shrill whistle. I want you to note particularly that when we turned off the flame in that appliance the whistling stopped immediately. And by turning it on, almost instantly we have a whistle again. Perfect controllability of heat.

Now we'll challenge Mr. Flameless in a minute if he ever gets hot enough to whistle. There we are, we're finally getting a whistle. Now, that's 4 minutes and 29 seconds. You'll notice that the heat is all turned off, but the teakettle keeps whistling and the only way you can stop it is to take it off, even after the heat's all turned off. Put him back on, and he'll whistle again. Now if that's controllability, I would like to know it. That is heat, residual heat in the top of that element —and incidentally, it's heat that you pay for. You had to put it there to start with and even though you're through making that pot of tea, the heat's still there.

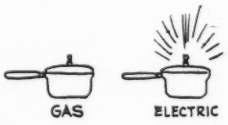
Pressure Control

Now that goes just as well, ladies and gentlemen, if these were thermostatically controlled tops.

Now we'd like to go one step further and show you another example of the controllability of these two units. We have here two pressure cookers, both empty, and we're going to put an equal amount of water of identical temperatures in each of them. We'll put these covers on and lock them, and turn the heat on to top capacity.

We have up here two pressure gauges, con-

nected to each pressure cooker. We're going to bring the pressure up to 10 lb in each case and at that point we're going to try to maintain that pressure.



Notice the pressure already going up from the utensil being heated by the flame. The pressure is now at 5 lb. The poor old boy over here (Mr. Flameless) hasn't even got a tremor going yet.

Now that the cooker on the flame has reached 10 lb I am going to ask Mrs. Flame to turn the flame down to a low position. If you will watch that dial, you will notice that there will be very little, if any, variance in that pressure. We have perfect control of that flame for holding the pressure at 10 lb.

(Later) Well, Mr. Flameless finally got up to 3 lb. Notice how slowly the pressure comes up, as compared with the speed with which we brought the pressure up on the flame appliance.

All right, we're at just about 10 lb. Now we're going to turn it down to its lowest point. Let's see what happens. Here you will notice even though we have it at low, the pressure is continuing to climb; again, that is due to the fact that we have that residual heat in that element which we cannot control. It's there and you put it there; you paid for it when it went into the thing, and it will continue to build that up.

Meat Shrinkage

Now, you have heard a lot about meat shrinkage and the fact that certain fuels have a greater effect on the shrinkage of meat and I would like to show you a chart here having to do with the shrinkage of meat. This statement was made by outstanding authorities for Hormel & Co., National Livestock Board, Armour Co., Wilson Co., University of Texas, University of Missouri, Iowa State College: "There is no difference in meat shrinkage due to fuels—absolutely no diffference." That sounds reasonable, because that roast you put in the oven doesn't know whether it is being cooked by Flame or Flameless or corncobs for that matter. Here are some figures of per cent of loss from shrinkage in roasting by flame and by flameless. You will notice that there is very little difference.

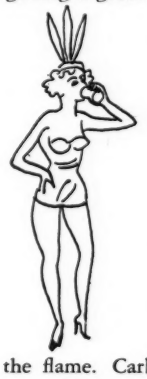
Time and temperature are the basic factors that control the shrinkage of meat. Fuel has nothing to do with it.

We showed you a few minutes ago how fast Mrs. Flame was by the operation of these two counter appliances. Now I'd like to show you a few figures regarding the speed of Mrs. Flame compared with other fuels. She is fast but well behaved. On a range top we took 45 pints of water and raised it to 200°F. With the flame it took 7.3 minutes, with flameless it took 9.8 minutes, or 35% longer. To bring an oven to 400° required 43 minutes with a flame, 69 minutes, or 60% longer, with flameless.

The fourth point we would like to make is the matter of safety. Accidents do happen in the home. When they do, they don't happen in any greater proportion with Mrs. Flame than with the other fuel. Here is a list of casualties by various causes as reported by the National Fire Protection Assn. for the year 1948, the last year the figures are available. Here are 25 different causes of casualties. Flame gas appliances rate 22nd. There are 21 other causes which show greater losses, both in number and in dollar losses than Mrs. Flame.

Flame Is Clean

Now we hear a lot about cleanliness of fuel. Here we have a flame, which you can see, and we're going to put this flame into this water, which is crystal clear. The flame continues to burn, the water immediately in touch with the flame is boiling, and we're getting a great deal of agitation, as you can see. We're going to have it in there for a minute. If there were any impurities, chemical or otherwise, in that flame they would now be in the water.



The flame is still ignited. You will notice the water is just as clear as it was before we put the flame in it. Now we have done nothing to that water other than heating it and we have added to it only carbon dioxide which was added by the flame. Carbon dioxide is exactly what you add to any water to make carbonated water. We're going to have a glass of this water. You can see it's crystal clear. Mr. A. here, would you come up and drink this water, please?

That proves, gentlemen, that proves that the flame is definitely clean.

Now, the sixth point we are going to talk to you about for a moment is the matter of coolness. There are a lot of conflicting stories as to the heat or the coolness of certain types of fuel and I'd like to show you this diagram indicating that Mrs. Flame is cool and she is hot when wanted. This is an actual test in a typical air-conditioned restaurant and this is a layout of the restaurant. This is the kitchen area and there is the dining area. Here is the temperature on the outside the day the tests were made. Now, in this restaurant there are 44,000 cu ft of space. In Washington, I believe the code calls for eight changes of air in a restaurant kitchen in an hour.

We're going to expel 6000 cu ft a minute out of this kitchen. The air that we take out must come through the dining room, pass through the kitchen and out the exhaust here. The air which is taken by the flames is only 57 cu ft per minute or less than 1% of the 6000 cu ft that we move through there. Actually, in expelling this air at this point through the kitchen, drawing it through the dining room, we are giving the employees in that kitchen more fresh air than they would get in ordinary operation of the kitchen because we are moving that much air. Ventilation is very important in any kitchen. We have here a type of ventilator which maybe some of you have seen and we're going to make a test there. Note that the bottom of the pot is clean too. There's water in it. Now we're going to put in some dry ice so as to again create a vapor of carbon dioxide, and we're going to show you that a proper ventilation of the kitchen will expel this vapor, which in terms of a restaurant would be the cooking odors. All the cooking odors will be expelled rapidly. You'll see that they go out the ventilator.

While this is a certain type of ventilator, any type of hood properly designed and constructed will do a similar job. You will notice the vapor is moved in, right across the front of the range or at any side of the range. Here I stand very cool because the air that is passing by me is going up that ventilator.

Modern flame appliances are all well insulated, ovens are all insulated so we have no heat loss through the sides of these walls. The only heat that is generated in the kitchen is the heat from the cooking food, and with a proper ventilating system, that heat and those odors are drawn out and expelled.

In the test that was run, an analysis was made of the air in that restaurant and it proved conclusively that there was no difference in the oxygen content of the air.

The last point we would like to make is to show you that Mrs. Flame is a protector of your profits. We have here a monthly profit and loss statement of two types of restaurants—a small restaurant with a monthly volume of $5000 and a cafeteria with a monthly volume of $20,000. This is the food and payroll for the restaurant. There are your cooking fuels and other expenses, and your total expenses when you use flame are $4850 out of a take of $5000. That represents 97% of your revenue and leaves a profit of $150 or 3%.

Now let's look at what happens to this restaurant with flameless. Cooking fuel now costs $175 as compared with $50. That's 3.5% of the monthly income—the total expenses go from $4850 to $4975 or 99.5% of the total business, leaving a profit down here of only $25 or .5%.

Now let's go over to this cafeteria where the monthly volume is $20,000. The total expenses using flame are $19,000, or 95% of the monthly business, leaving a 5% ($1000) profit.

Let's switch to the other type of fuel. Immediately the fuel cost jumps from $140 a month to 240 or from .7% for fuel to 2.1% for fuel, and what happens to our profit picture? With Mrs. Flame he makes 5%. When he changes to the other fuel profits drop from $1000 to $720; percentage-wise, from 5% to 3.6%.

Reddy CAN'T Compete

SMU commercial cooking tests show gas' amazing cost advantage

HERE'S proof of the astonishing cost advantages of gas over electricity:

Lone Star Gas Co. and the AGA ran a test at Southern Methodist University, Dallas, from Sept. 27, 1948, to March 18, 1949. Two commercial kitchens were set up, one electric and one gas, of comparable size and with comparable equipment. Appliances, consisting of three sections in each kitchen, two three-section bake ovens, and two deep fat fryers, were individually metered.

In the gas kitchen, 179,583 meals were served; in the electric kitchen, 151,550. In summary, it was found that, for total overall usage of all appliances, 1 electric Btu did the work of 1.621 gas Btu's. Individually, the ratios varied:

Ranges—1 electric Btu=1.267 gas Btu's
Deep fat fryers—1 electric Btu=2.082 gas
Bake ovens—1 electric Btu=2.481 gas
Kilowatt demand: 60.5% of the total connected load would be applicable to demand charges.

How these basic facts could be put to work, when combined with other available cost data, is illustrated in these elements of a sales letter prepared for a hospital:

SUMMARY REPORT: Estimated Cost Analysis Between Gas and Electric Commercial Cooking Equipment

1. Estimated initial equipment cost comparison		
Electric equipment	$15,344.00	
Gas equipment	10,389.00	
Saving in favor of gas equipment		$4,955.00
2. Estimated initial installation cost comparison		
Cost of electric installation	$ 9,000.00	
Cost of gas installation	800.00	
Saving in favor of gas equipment		$8,200.00
3. Estimated fuel operating cost comparison		
Electric fuel costs per month	$ 433.02	
Gas fuel costs per month	61.67	
Saving in favor of gas equipment per month	$ 371.35	
Estimated yearly saving with gas		$4,456.20
Ten years' saving	$44,562.00	
Twenty years' saving	$89,124.00	

Supporting data were attached. For Item 1, inital equipment cost, a comprehensive price list for all types of comparable equipment was supplied. For Item 2, installation cost, the data sheet said:

This estimated installation cost for electric appliances is based on information received from a local consulting engineering firm and is only a broad estimate. We were informed that an extra transformer room of approximately 10 x 10 will be required as well as the purchase of additional transformers to control the kitchen appliances and secondary connecting lines to the appliances. Heavier service wiring will also be required together with heavier wire in conduits to supply the various kitchens listed.

Gas piping lines have already been installed to loop the building for gas supply to turbines and boilers. Estimated cost of gas piping is supplemental piping to supply gas to the various kitchens listed. No estimate is included for kitchen ventilating hoods over the cooking equipment as this cost would be the same for both fuels.

In support of the estimates on comparative operating costs, the sales letter related the summary findings of the SMU tests on all major cooking appliances as follows:

Replacement factor was 0.553 therms per kwh. Since 1.621 gas Btu was found equivalent to 1 electric Btu, and since there are 3412 Btu per kwh, the thermal value of 1 kwh=1.621 x 3412, or 5530 gas Btu's. In other words, .0553 therm (since 1 therm=100,000 Btu.) Consumption per meal was 0.3925 kwh, as against 0.0217 therms, or 2.066 cu ft of 1050-Btu gas.

The existing gas commercial cooking equipment now in use in the main kitchen at XYZ hospital consists of the following:

Number	General Description	Total Btu Maximum Input
3	Ranges with ovens	342,000
4	Roasting ovens	144,000
1	Bake oven—3 sections	79,000
1	Deep fat fryer—18-in.	43,000
1	Light restaurant range	226,000
1	Griddle and broiler	55,000
1	Savory toaster	20,000
12	Total Btu input	909,000

The above appliances used 920,400 cu ft of gas for 12 months in 1947 or an average of 76,700 cu ft per month. The average per month for 1948 was 77,083 cu ft, thus showing a consistent monthly average over a two-year period.

It seems reasonable to assume that the kitchen usage factor between the present kitchen and the proposed new kitchen will be comparable. If this be true we can arrive at an estimated monthly gas consumption figure for the proposed new gas equipment by a ratio comparison as follows:

2,080,000 Btu (total Btu input of all new equipment) would be to 909,000 Btu (total Btu input of present equipment) as "X" (amount of gas new equipment should use) would be to 77,000 cu ft (actual average monthly gas consumption on present gas equipment).

This figures out 176,194 estimated cu ft per month.

SMU tests conclusively proved that it required 1.621 gas Btu to equal one electric Btu for overall operation of the major cooking appliances. It is therefore necessary to convert the number of gas Btu in 176,194 cu ft into the equivalent number of electric Btu that would be required before the number of kilowatt hours and the cost thereof can be determined.

Basis of conversion

1 kwh=3412 Btu
1 cu ft of natural gas in Dallas=1050 Btu

176,194 cu ft per month
176,194 x 1050 = 185,003,700 gas Btu per month
185,003,700 ÷ 1.621 = 114,129,365 electric Btu per month
114,129,365 ÷ 3,412 = 33,449 electric kwh per month

Estimated Monthly Fuel Costs

ELECTRIC: With the constant daytime electric load of elevators, X-ray rooms, auxiliary air conditioning power, laundry load, ice water, hall and room lights, etc., there appears to be no question but that the electric cooking load, if installed, would fall on top of the existing daytime peak load and therefore increase the connected kwh demand charges. The total connected load of the electric commercial appliances as listed would be 377.6 kwh. A most conservative estimate for demand charges would be three-fifths of the total connected load or 226 kwh additional demand charges for the electric cooking appliances.

Under the PL-3 rate schedule the demand charge per kwh connected is $1.25 per month.

226 kwh demand
x $1.25 = $282.50 - demand charges per month
33,499 kwh x $.0045
(lowest step) = 150.52 - current charges per month

Total estimated operating cost per month $433.02

GAS: With gas being used for air conditioning energy in the summer and for boiler operation in the winter, all commercial cooking gas will be charged at the lowest step of 35 cents per 1000 cu ft.

176,194 cu ft x $ .35 = $61.67, total estimated operating cost per month.

(Continued from Page 39)

side by side, he made coffee on each. Gas made coffee in 5 minutes, 27½ seconds. Electricity made coffee in 13 minutes, 50 seconds. Stop watches and whistles were used by members of the audience for timing.

Says the Harper-Wyman booklet: "It takes over two minutes for the average electric unit to reach full heat."

The Caloric brochure reports that its exhibit at the Chicago Furniture Market last June proved that the minimum time required to boil water with gas was 2 minutes, 9 seconds; with electricity, 4 minutes, 7 seconds.

Cost. The SMU study nails this story down beautifully. Southern Counties used meters during a baking test to show that electric consumption for the same job cost three times as much as gas.

Lone Starmen worked out a demonstration that's a honey, and Chester May used it to good advantage in his talks. It's a huge board (see photo) with 272 50-watt light bulbs. Each burner on an electric range on stage is connected to a series of bulbs having total power equivalent to that used by the burner. We quote Lone Star's *The Blue Blaze*:

Mr. May uses the unit to debunk the statement that electric cooking is cheap, and that a family can cook for as little as $2 a month.

"Nellie Brown bought an electric range after listening to the smooth-tongued electric salesman and here's what happened when she started to use it," Mr. May explains as he displays a menu for a "simple" meal, costing a total of 66 cents in groceries. In it are soup bone, 30 cents; beans, 12 cents; tapioca, eight cents; eggs, 10 cents; coffee, three cents, and toast, three cents.

One by one Mr. May goes through the motions of putting over the items of the meal. The soup bone is placed in the deep well and when the switch is turned on, 25 of the 50-watt light bulbs glow brightly into the eyes of his audience. Beans are put in the oven and on go 76 mile 50-watt bulbs. Cooking eight cents worth of tapioca on the right rear element turns on 25 bulbs; eggs on the right front burner, 41 bulbs; coffee on the left front burner, 25 bulbs and, finally, the broiler for making four pieces of toast, 80 of the 50-watt bulbs.

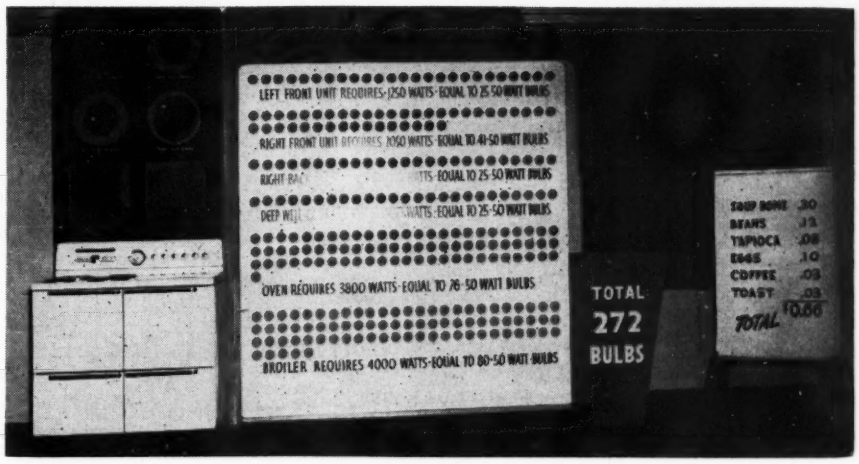
"There it is," shouts Mr. May, "enough to light the biggest church in Waco! Thirteen and six-tenths kilowatts per hour to cook 66 cents worth of food.

"Even at the low electric rate of two cents per kilowatt hour, this means that with only 7½ hours of use during an entire month, the electric bill would be $2.04. And what family can cook for a month in 7½ hours? Yet our competition makes a claim that it can be done."

Mr. May points out that gas provides the heat to generate electricity in this part of the country. "And when you turn that electricity back into heat to sell as heat, it becomes a costly process.

"It's an expensive procedure for a very poor substitute!"

Mr. Lynn used a variation of the idea for his talk before the restaurant men—a brilliant display of light from 219 100-watt bulbs, strung across that ceiling of the auditorium, illustrating the amount of current needed to operate a single commercial hot-top range.



LONE STAR uses light bulbs to show tremendous consumption of fuel by electric range, proportionate high cost of electric cooking.

Controllability. The story told by Mr. Flameless and Mrs. Flame is essentially the story told by others, with pressure cookers and whistling teakettles as the props. In some demonstrations, boilovers with foods left on electric elements after the juice had been turned off were used to advantage. The Harper-Wyman booklet effectively points out the difficulty of getting the right heat with the five-heats available on electric ranges.

Safety. Questioning the safety of gas has been a low blow on the part of the competition. As is pointed out in the Flameless - Flame story, statistics are available from the National Fire Protection Assn. to show gas is much safer than electricity. (See *GAS*, July 1949, pp. 40-41.) In replying to electric industry implications, Harper-Wyman points out that you can't blow out the full flame on a top burner. The deceptive appearance of a recently turned-off electric unit is a much graver danger than a flame.

Cleanliness. This is the big point of supposed superiority that electric range makers beat almost to death. To demonstrate the fallacy, Southern Counties placed a sheet of paper on an electric range top, cutting out holes for the burners. Grease from frying foods spattered the paper as effectively as they would have with gas. Southern Counties also showed, in a broiling operation, how the oven door must be left open lest the thermostat shut off the current, and how fat on the meat is only heated, whereas with gas it's incinerated. The boilover was also used effectively.

Coolness. Here's how Mr. Lynn put it, according to *The Blue Blaze:*

With reference to "cool kitchens," Mr. Lynn explained that cooking surface temperatures of hot top ranges vary from 600° up to 1000° and these temperatures are necessary to do a cooking job.

"It doesn't make any difference whether these temperatures are supplied through gas or electricity. One thousand degrees is 1000°, regardless of the fuel. The radiant heat coming from the solid top will be just the same on either a gas or electric range and the cook will be just as hot with one fuel or the other."

The secret to kitchen temperatures is proper hood ventilation, he pointed out, to take out cooking heat from the hot top, heat from the stock pot, cooking odors, and food greases. The hood must be properly sized to do a proper ventilating job and if so sized, the heat from cooking processes is taken outside of the kitchen.

He illustrated this by a smoke test in which he used a battery of commercial gas ranges installed on the stage with one properly sized and one improperly sized vent.

Profit-making ability. This is pretty much inherent in operating costs, so, aside from the Flameless-Flame demonstration, the SMU test is the best guide.

There's another pivotal point of argument that wasn't listed specifically in the Flameless-Flame show, but which was nonetheless demonstrated there. It's *meat shrinkage*, and here again gas has to go on the defensive, because the competition dreamed up this one.

Says the AGA bulletin: "Restaurateur-Engineer (Henry G. Linck of Toledo) Finds Gas Oven Shrinks Meat Less." Says Mr. Linck, reporting on his own tests:

"The average percentage shrinkage in the electric oven was 16.9% while the average shrinkage in the gas oven was only 11.9%."

The tests were repeated a sufficient number of times to assure the accuracy of the results. Mr. Linck explained that, "Thermostats were set at 300° and were checked continually throughout the entire tests by using thermocouples and temperature gauges which made it possible to determine temperatures without opening oven doors. Standing rib roasts were cooked to an average internal temperature of 135°."

The bulletin also describes tests that AGA ran in its own laboratories, which proved less shrinkage with gas. They are reported in AGA Research Report 1162, Project C-5.

These are the facts and the tools with which to put electric cooking in its place, with "Mr. Flameless and Mrs. Flame" as the framework.

Now is the time to use them.

convention comments

... significant quotations from significant addresses delivered at the 1950 American Gas Assn. convention in Atlantic city last month ...

"In my opinion the most critical problem facing us is to awaken our industry and particularly top management of gas utilities and gas appliance manufacturers to the crying need for a greater sales effort. But in the long run, our sales results will be no better than the products we sell.

Because of this I should like to throw out for your consideration the idea that we might well think seriously of upgrading our products and establishing higher minimum requirements for gas appliances and higher goals for our research programs.

There have been relatively few radical improvements or changes in the gas range and the automatic gas water heater in recent years. And when we *have* had improvements, as exemplified by the CP range, wholehearted industry support has been lacking. This lack of support makes it economically impossible for the gas appliance manufacturer to continue his research. An improved range is no good to him if 50% of the country's gas utilities fail to support it for one reason or another.

With our competition aggressively hammering away at the modernity, cleanliness, and coolness stories, it is apparent that the gas industry must make every effort to make sure that modern gas appliances are equal or superior in quality, styling, and modernity. It seems to me that now is the time to include some performance specifications in basic AGA requirements. This issue is one which, in my judgment, we must clear up, and *soon*. Are we going to make up our minds to the fact that the gas range which ignites at all use-points automatically and remains cold when not in use is to be a standard and basis for our promotion and development, or are we going to continue to tolerate the sale of match-lit or non-automatically-lit gas ranges?

Hugh H. Cuthrell
Outgoing president, AGA

"Some men in the gas industry feel that the trend to electriciy is inevitable and cannot be stemmed. The writer does not share that point of view. There are those in our industry who bemoan the fact that we have no large sponsors in our industry such as Westinghouse, General Electric, General Motors and others, who outspend the gas industry about 30 to 1 in publicity. There are still others in the gas industry who feel that the rapid growth in the use of gas for house heating makes it unimportant if the industry loses some of the cooking and water heating load. Here again, I disagree as I feel it is imperative that the gas industry retain all of the loads for which gas can be utilized. There is no good reason for assuming that the gas industry can permanently hold the house heating load with the prospect of electric house heating, atomic energy, and many other things that may come into the picture.

The answer to the industry problem, as the writer sees it, is the re-establishment of aggressive sales departments by all gas companies employing large numbers of house-to-house canvassing salesmen. The best selling jobs done in our country today are being done by salesmen.

The gas industry cannot attempt to match the large sums of money that are being spent by competition in national advertising and other publicity but it can match competition with salesmen who can do and will do the selling job.

W. L. Hayes, general sales manager
Montana-Dakota Utilities Co., Minneapolis

"The scheme for dividing the country into nine "valley authorities" is the social planners' *piece de resistance.*

Listen to this dream of power:

The nine authorities would take over the great river basins. The states would lose their jurisdiction over the waters.

Within its own area, each authority would have complete charge of all flood-control work, navigation, irrigation, soil conservation, and all forestry affairs.

More than that, each authority would also have complete control of all the electric power in its area—the lifeblood of industry.

Each authority would be presided over by three appointed officials.

In other words, 27 politically-appointed potentates would dominate the economy of the whole nation.

The cost? Well, maybe the cost is not important. One well-known political leader, on a "non-political" trip around the country, said the funds spent are not "expenses." He said you will more than get your money back from such projects.

If that's so, you can expect to do pretty well because the ultimate cost to the taxpayer of the valley authority plan is estimated at $53 billion.

Arch N. Booth
Executive vice president
U. S. Chamber of Commerce

"It is estimated that this year the sale of "CP" ranges will be approximately 300,000 units, or approximately 80,000 more units than last year. Gas range manufacturers will spend this year approximately $3.75 million in all types of advertising alone in the promotion of their products ($442,000 of which was spent in consumer magazines the first six months of 1950, or an estimated total of over $1 million for the year of 1950), which should prove to all members of the gas industry that the gas range boys are on the ball and really spending money.

How much are you really willing to spend to protect an investment of approximately $7.9 billion with revenues of

About-Face for Merchandising!

Hardwick's national advertising reflects the return to fundamental selling of gas at its best—an emphasis on cooking performance rather than eye-catching gadgets or non-essential extras. Here, in forthright magazine ads keyed to these times, your customers will see a compelling story evolved from the experience of your own crack salesmen. They know that in selling gas ranges the easiest volume-building slant is the simplest: "Judge only the top burners, the oven, the broiler". While Hardwick ads help you to stress the features necessary to superior cooking, the Hardwick line enables you to offer them at prices eight out of ten customers can afford.

CRACK SALESMEN STRESS THESE

PERFECT TOP BURNER

BALANCED HEAT OVEN

LIVE-FLAME BROILER

Tie in your own ads, windows and radio programs with HARDWICK'S story in—

HARDWICK
AUTOMATIC GAS RANGES

HARDWICK STOVE COMPANY • CLEVELAND, TENN.

$1,694,331,000 or approximately $47 a year per residential customer, and out of that amount approximately $32 a year from gas ranges, based on 1949 figures?

It is estimated that all gas water heater manufacturers will spend this year approximately $450,000 in the sale and promotion of a cleaner and better way of life for every American, in national publications, or a total for all types of advertising of approximately $1.5 million. They can't do this job alone.

Let us look at the house heating and space heating segment of our business. There are many ponderable problems as we deal with this subject. I cannot devote my time to raising many questions concerning this phase of our industry, except to say that decisions on the transmission of natural gas for house heating must become more stabilized for this segment of our industry to grow into the tower of strength that it should. There are still many critical areas when it comes to supply of natural gas for house heating. But again, let's look at the record. It is estimated that gas house heating manufacturers will spend this year approximately $800,000 to bring this new comfort of life into the American home, through national media, or approximately $3.5 million in all types of advertising. They, too, need your support.

In the promotion of gas laundry driers and incinerator equipment, it will be of interest to you to know that approximately $120,000 will be spent in 1950, through national media, to improve the standards of living in the home.

Having a look at the total, it is estimated that approximately $3 million will be spent by the gas appliance, equipment, and accessory manufacturers this year, in national media alone. This relates to an expenditure of approximately $9.5 million for all types of advertising by all types of manufacturers in the gas industry. I cite these figures to indicate to you that good progress is being made, along with the expenditure of AGA in advertising of approximately $800,000; but I remind you also that the progress to date is not sufficient and that you can't do "spike driving with a tack hammer."

Stanley H. Hobson
Outgoing president, GAMA

LEFT TO RIGHT: Stanley Hobson, GAMA outgoing president; W. L. Hayes, Montana-Dakota Utilities Co.; H. G. Smith, Consumers Gas Co. of Toronto; Emil Biard, Association Technique de L'Industrie du Gaz en France.

"The average motor vehicle accident, large or small, costs about $115. Out of this amount, the insurance carrier pays about $80, the legal liability for personal injury and property damage. The remaining $35, and I want to stress that this is merely *an average figure,* represents the uninsured portion of the bill.

You may think that $35 is a small amount per accident for indirect losses, but that is why I emphasized a few moments ago that this is *an average loss.* Let me cite the other side of the story. Edward J. Emond, director of automotive safety for Armour & Co., recently told me of an accident on July 20, 1949 near Chamber, in Apache county, Ariz. that cost the company $5611.16 in indirect costs. This meant that, since Armour's net profit on a pound of meat is 1/5 of a cent, they had to buy, slaughter, process, merchandise and deliver 2,805,580 lb of product to make up the loss from this one accident—3200 head of choice steer had to be dressed, and the company had to make a cash outlay of $800,000 for cattle and labor to recover $5611.16 . . .

The vehicles of the companies you represent are "rolling billboards," as my friend Dwight M. McCracken, of Liberty Mutual Insurance Co., has pointed out.

Are your vehicles driven *so as to attract favorable attention?* Do you realize the advertising value of well-trained drivers? Let me explain the importance of this idea.

In the United States some $60 million is spent annually for outdoor advertising. McCracken told of one large metropolitan area where a representative showing, so-called, consisting of 160 billboards, cost the advertiser $4000 a month. The "net advertising circulation" of these was estimated by the Traffic Audit Bureau Inc., at 650,000 persons per day, which means that that many people *see* the advertiser's message every day.

A fleet operating in this area has 205 delivery vehicles. Think of the business value of these "rolling billboards" as they are seen by countless thousands in their daily travels! If they were stationary billboards, they would cost that same company $5000 a month just for the advertising space. When we think of vehicles, we usually consider them primarily as an investment in transportation, but these figures prove that they are also an investment in advertising and can yield a valuable sales return *if driven so as to attract favorable attention.*

Amos E. Neyhart
Institute of Public Safety
Pennsylvania State College

"Our industry sends out hundreds of thousands of disconnection notices each year, and the majority go out to the same customers month in and month out. Does it really seems sensible to repeat the same old routine of sending a bill and then writing to the customer and saying the same old thing? How much effort do we really exert to arrive at an understanding with the customer about regular payment of his account to avoid these notices?

Here's what the New York Telephone Co. says about it:

> Action directed only toward collection of the amount of the bill owing at the time tends to result in the necessity for repeated collection efforts in subsequent months and, therefore, efforts should be directed towards developing regular paying habits by giving customers an *understanding* as to when and how bills are rendered and when payment is due.

I have emphasized the word "understanding" because it is the key word to this entire subject. I know that a lot of you will think that I'm suggesting the impossible, that we can't change the customers' paying habits. The telephone company apparently thinks we *can* change customers' paying habits, and I know from my own experience that we can—by simply making a personal call on them.

It will, of course, be more of an expense at the outset to call on these customers, but from tests made by some of us it appears that a majority of the customers who are now receiving disconnection notices regularly will respond favorably and pay their future bills without any collection action.

Tests which have been made brought out that some customers were still nursing old gripes which the company representatives were able to settle. You see, it was just a lack of understanding of something which the company had done.

Of the small number of customers interviewed during the test, 68% paid future bills within the agreed-upon time after receiving the bill and returned to the good-pay class.

C. L. Havener
Consolidated Edison Co. of New York

Choosing Substitute Gases For Milwaukee

. . . utilization tests showed which gases were best to provide standby for natural gas

By E. C. BRENNER

THE arrival of natural gas in the Milwaukee area brought with it the problem of providing a standby gas to be used in the event of an interruption in natural gas supply. Coke oven gas, carburetted water gas and LP-air gas production facilities, which had provided the manufactured gases previously distributed, were available to provide standby gases. It remained to determine whether these gases, or modified gases produced in the plants, could be utilized satisfactorily as a substitute or standby gas by consumers' appliances.

A decision was made to set up a special utilization laboratory for this purpose. Discussion of the problem with the staff of our associated company, the Michigan Consolidated Gas Co. of Detroit, disclosed that they were in the process of setting up such a laboratory at their River Rouge plant to solve a local problem. Burners and equipment were chosen typical of equipment in actual use in the Milwaukee area. Where applicable, the appliances were equipped with velocity reducing orifices and otherwise modified as were consumers' appliances in the recent conversion to natural gas. Included were burners which were known to be difficult to operate satisfactorily with substitute gases. *Figs. 1 and 2* show the floor plan of this laboratory and the appliances selected.

A series of demonstrations was performed to show the extent to which substitute gases are interchangeable with natural gas of 1010 Btu, 0.685 sp gr, and generally described as "low methane-high inert" natural gas.

Substitute gases employed were:

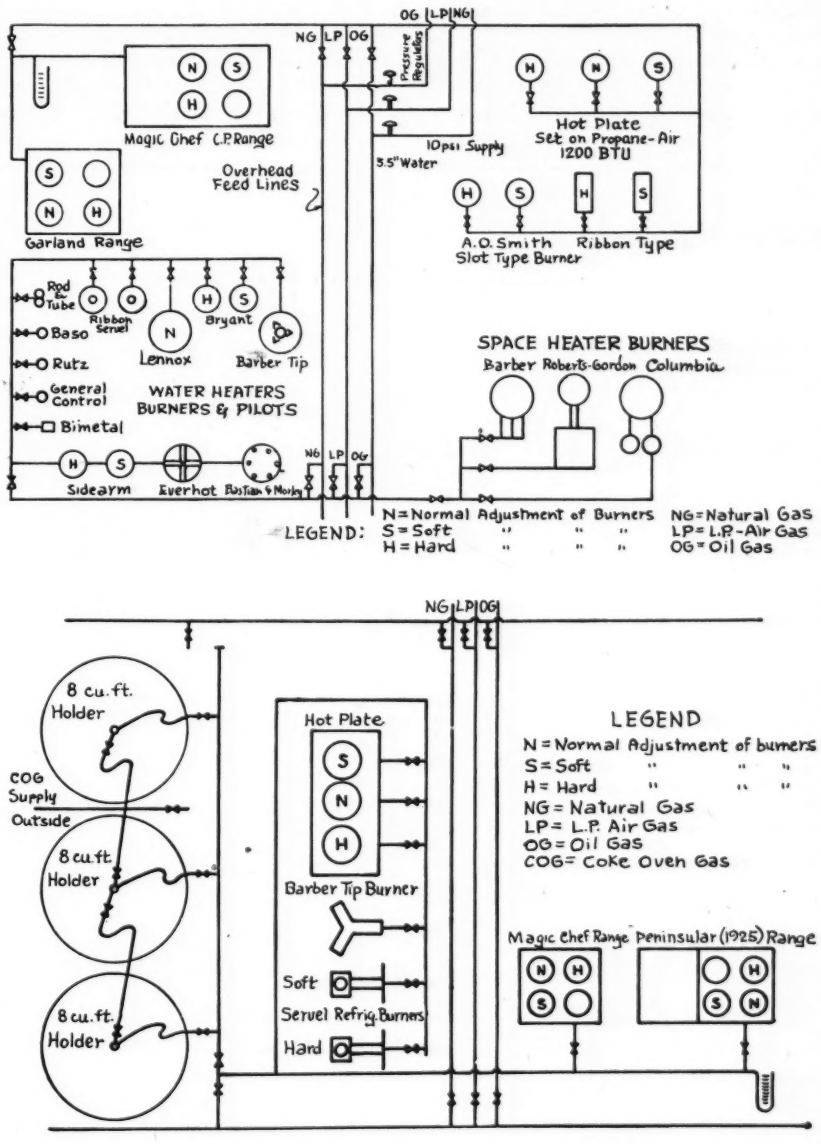
(1) Oil gas of 910 Btu, 0.70 sp gr

(2) Propane-air gas of 1200 Btu, 1.244 sp gr

(3) Coke oven gas of 540 Btu, .40 sp gr

The performance of these gases was demonstrated, both as single component gases and as mixtures, on the appliances shown in *Figs. 1 and 2.*

The mixtures of gases used in the demonstration contained limiting percentages of standby gases with natural gas or optimum combinations of stand-



Figs. 1 and 2, above, show floor plan of the laboratory layout, indicating placement and adjustment of appliances used in test.

The necessity of selecting a standby gas for natural gas once it was introduced into the Milwaukee system led to a series of tests, reported on herein, to determine which would burn best in customers' appliances adjusted for natural gas.

Initial tests were performed on a pair of six-unit Bunsen burner banks. With the burners adjusted to natural gas, substitute gases were introduced; then the burners were adjusted for the substitute gases, and natural gas was again turned into the manifolds. From this phase of the study, the testers moved on to the appliances; finally, experiments were conducted with the gases mixed in the ratios listed in the article.

Mr. Brenner's study, presented before the operating section meeting of the American Gas Assn. convention in October, included considerable background data on interchangeability, and described the tests in detail. For publication purposes, the editors have reproduced only the brief description of testing facilities and the discussion of actual results.

Mr. Brenner is vice president in charge of operations, Milwaukee Gas Light Co. This is a shortened version of a paper he presented at the AGA convention, Atlantic City, Oct. 2-6.

by gases for maximum useability. Preliminary trials performed at the utilization laboratory on numerous combinations indicated, generally, the limiting percentages of the components. Although data were already available for all of the possible combinations of standby and natural gas, tests were performed on at least three combinations of each pair of gases for purposes of confirmation.

Mixtures of 20%, 30%, and 50% coke oven gas in natural gas were tested. The investigation showed that the 20% mix was unquestionably satisfactory, that the 30% mix was tolerable and that the 50% was allowable in an emergency.

Tests of mixtures of 35%, 50% and 70% oil gas in natural gas indicated that the 35% mix was completely satisfactory and that 70% mix was tolerable. The 70% mixture caused the burners, which had been adjusted on the soft side of normal, to display traces of yellow tips and the hard burner to become rather noisy, but without a tendency to flash back.

Propane-air gas of 1200 Btu per cu ft was mixed with natural gas in the percentages by volume of 15%, 30%, and 45% propane-air gas. The 15% mixture was unquestionably satisfactory, 30% normally tolerable, and 45% was considered tolerable in emergency. Test data indicated that if propane-air gas exceeded 45%, the mixture was inferior to the performance of 100% propane-air gas.

Oil gas and coke oven gas mixtures were tested at percentages of 20%, 30%, and 40% coke oven gas. It was determined that the addition of coke oven gas does not improve the yellow tip conditions of the soft burner, and that the undesirable features of the hard burner, namely, flash back and noise on extinction are accentuated. It was concluded that mixtures of oil gas and coke oven gas should not be used except in extreme emergency.

Propane-air gas (1200-Btu) and oil gas were investigated in the combinations of 40%, 55%, and 70% propane-air gas. Tests made of these mixtures indicated that propane-air gas can be mixed with oil gas in any proportion and generally improve burning characteristics; however, it was found that in mixtures containing more than 50% propane-air gas, there was a marked tendency for the soft burners to soot but that all tendency to flash-back is eliminated. A 50/50 mixture proved to be the optimum combination of these gases.

Final Pair of Mixtures

The final pair of mixtures tested in the preliminary investigation involved three constituents. The following mixtures were tested.

1. 20% propane-air gas, 30% oil gas, 50% natural gas
2. 35% propane-air gas, 35% oil gas, 30% natural gas

The results of the test showed mixture (1) to be normally tolerable and mixture (2) to be unsatisfactory because of yellow tip conditions on the soft adjusted burners. On the basis of these findings, it was decided to use a mixture of 20% propane-air gas, 35% oil gas, and 45% natural gas in the final demonstration.

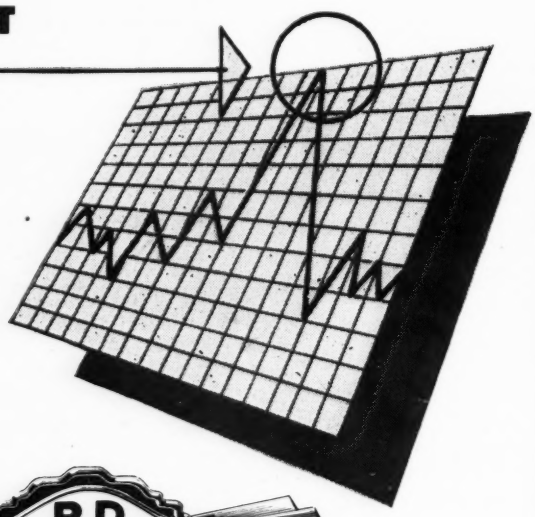
A mixture not investigated at this time as those above, but for which data were available, was coke oven gas enriched with undiluted propane-vapor. It was concluded that straight propane enrichment was unsatisfactory and that bad soot conditions existed for any enrichment in excess of 20% propane-vapor. It was also determined that there was no recovery from flash-back in Barber tip burners when using high ratios of enrichment.

The demonstrations show that:

1. Propane-air gas, oil gas or coke oven gas as a standby gas cannot be used as a 100% interchangeable gas for natural gas.
2. Any one, or a combination of these gases, may be added to natural gas in the limiting percentages indicated to augment the

YOU CAN MEET

PEAK LOAD DAYS



WITH A

GORDON BYDAND

Spreader-Flame

DUAL FUEL GAS-GAS BURNER

USING NATURAL OR MANUFACTURED GAS WITH LP GAS STANDBY

MODEL 302-21

All ROBERTS-GORDON Conversion Gas Burners are now available with built-in controls that *automatically* shift from city gas to LP gas when outside temperatures drop below a pre-determined setting.

Same rugged construction, using Gordon Spreader-Flame principle—offering low cost operation and long life features that have sold hundreds of thousands of Gordon Burners. Built by a pioneer firm in the gas burner business. Capacities from 120,000 to 900,000 BTU per hour.

Write for further information and name of nearest distributor.

ROBERTS-GORDON APPLIANCE CORP.

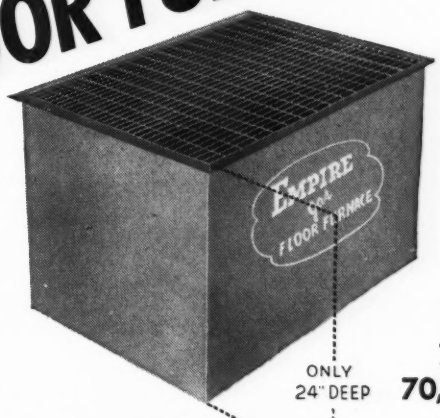
44 CENTRAL AVENUE • • BUFFALO 6, NEW YORK

Zone Control

WITH

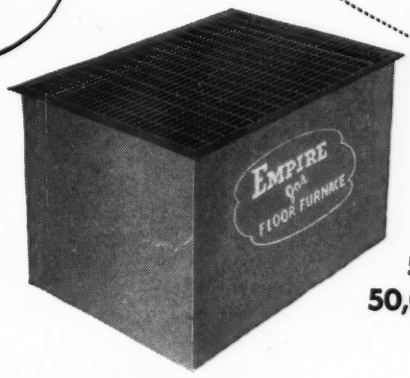
EMPIRE GAS FLOOR FURNACES

NO INTERNAL *Baffles* TO BURN OUT

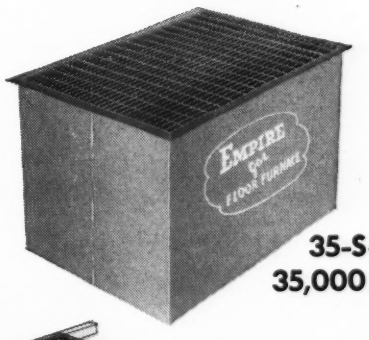


ONLY 24" DEEP

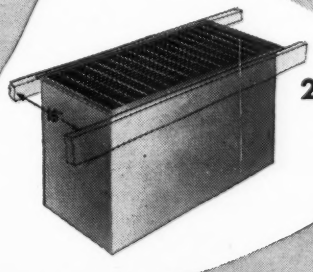
70-S-1
70,000 BTU



50-S-1
50,000 BTU



35-S-1
35,000 BTU



25-S-1
25,000 BTU

THE *Latest* IN MODERN GAS HEATING

Your customers will enjoy more comfort and lower operating costs when provided with a flexible heating system, enabling them to have different temperatures in the various sections of their homes.

An inexpensive, yet a highly satisfactory Zone Control Installation, can be accomplished by installing two or more Empire Floor Furnaces, individually controlled with Automatic Temperature Controls. Temperatures can then be controlled in the zone or section of the home in which each furnace is installed.

AGA APPROVED

EXCLUSIVE WITH EMPIRE

the FAMOUS

Gas BURNER

IT'S ENGINEERED, NOT ADAPTED FOR THE AVAILABLE GAS SUPPLY

EMPIRE STOVE CO. BELLEVILLE, ILL.

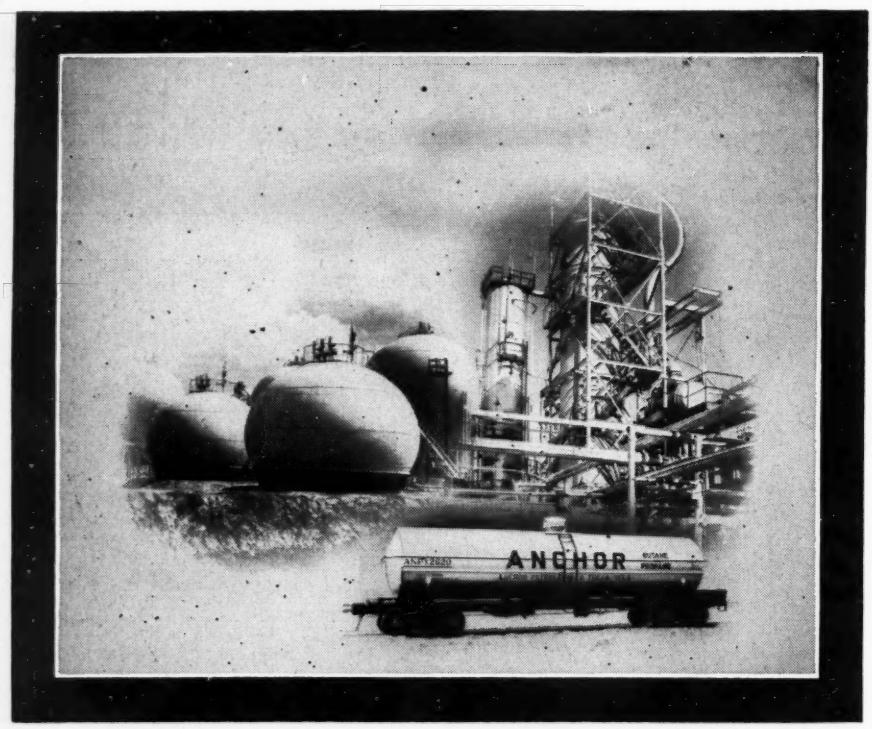
World's largest manufacturers of Floor Furnaces

city's gas supply in the event of a partial pipeline failure.

3. The mixture of 11% LP-Gas vapor, 30% oil gas, 34% coke oven gas and 25% natural gas, which corresponds to Milwaukee Gas Light Co.'s maximum existing and contemplated production and storage facilities, has a semi-tolerable useability and may be safely used in the event of failure of natural gas supply. gas supply.

Summary of Results

Kind of Gas	Useability Rating
Natural gas (adjust gas)	Satisfactory
LP-air gas	Not tolerable
Oil gas	Not tolerable
1. 30% Coke oven gas 70% Natural gas	Satisfactory
2. 35% Oil gas 65% Natural gas	Satisfactory
3. 25% LP-air gas 75% Natural gas	Tolerable
4. 30% Coke oven gas 70% Oil gas	Not tolerable (failure)
5. 50% LP-air gas 50% Coke oven gas	Not tolerable
6. 50% LP-air gas 50% Oil gas	Not tolerable
7. 20% LP-air gas 35% Oil gas 45% Natural gas	Satisfactory
8. 11% Propane Vapor 30% Oil gas 34% Coke oven gas 25% Natural gas	Tolerable
9. Propane air (1400-Btu 1.286 sp gr)	Satisfactory
10. Propane air (1400 Btu 1.328 sp gr)	Tolerable
11. 50% Oil gas 50% Propane-air (1800-Btu)	Tolerable
12. 60% Oil gas 40% Propane vapor	Not tolerable
13. 40% Oil gas 15% Propane vapor 45% Coke oven gas	Not tolerable



call anchor first

LP-Gas for: Stand-by Plants - Peak-load Demands - Industrial Plants - Cities and Towns

From our strategically-located plants we are able to give quick delivery on high-quality ANCHORGAS, Butane-Propane. Shipments by rail, water, or transport. For dependable gas service, call us before you renew your contract. Ask about Anchor's contract plan.

ANCHOR PETROLEUM COMPANY

Atlas Life Bldg. Tulsa, Oklahoma

ASSOCIATIONS

Fairless, Chapman Headliners On API Program This Month

Pipeliners and other gasmen are expected to flock to Los Angeles this month, joining oilmen for the 30th annual meeting of the American Petroleum Institute. This first meeting in the southern California city in 15 years will headquarter at the Biltmore hotel for the four-day gathering, Nov. 13-16.

B. F. Fairless

On a program whose scope rivals that of the AGA convention last month, gas business and allied fields will loom large. Some of the events expected to attract delegates from the industry are the pipeline symposium, considering pipe coatings, cathodic protection, and river crossing techniques; committee meetings on pipeline transportation; addresses on conservation and banking as it affects the gas business; and a talk on "Synthetics in Defense," by James Boyd, Bureau of Mines director.

A real turnout of "brass" is promised. From outside the petroleum business the program committee has brought in Gen. Lewis A. Pick, chief of engineers; Interior Secretary Chapman; and Benjamin F. Fairless, president of U.S. Steel; within the industry, W. Alton Jones, president of Cities Service Co.; Reese H. Taylor, president, Union Oil Co. of California; and, of course, API President Frank M. Porter, will speak.

For committee business, the meeting will stretch through nine days, with the first of such sessions taking up Nov. 9 and the last convening Nov. 17.

All told, nearly 100 committee meetings will be held.

On the lighter side, presentation of the gold medal for distinguished achievement will be made, and west coast oilmen will sponsor a gigantic banquet Nov. 15 at the famous Palladium ballroom in Hollywood.

Porter Scores End Use Aspect Of National Fuel Policy

Issues that are affecting the development of oil and gas resources came under surveillance last month, when the Texas Mid-Continent Oil & Gas Assn. 31st annual meeting was held in Dallas, Oct. 4-5.

Several hundred industry members from Texas converged on the city's Hotel Adolphus to discuss their problems, and to hear comments on the economic scene by a panel of eight principal speakers. In the free periods between addresses and group meetings, delegates competed in an annual golf tournament, were entertained by an hour-and-a-half variety program, and wound up the meeting with an all-membership banquet.

Frank M. Porter, president of the Ameri-

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PERFECTION Automatic Gas Water Heaters are sales-getters! That's a fact proven by utilities who push Perfection. These quality water heaters give 24-hour hot water service, day after day, year after year . . . with minimum service and maximum satisfaction. That means your customers get their money's worth and more. When you put your sales efforts behind PERFECTION you build not only sales but good-will as well!

Designed and manufactured by Combustion Engineering—Superheater, Inc., PERFECTION Automatic Gas Water Heaters are backed by the reputation of one of the biggest boiler companies in the world. C-E's background of experience applied to PERFECTION results in a fully automatic gas water heater that dollar for dollar, feature for feature can't be beat!

To complement your sales efforts, C-E has prepared a full-scale advertising and merchandising program that includes point-of-sale material, mats for your own local advertising, direct mail pieces . . . all ready for your signature!

And the PERFECTION line is designed for use with Natural, Manufactured, or Liquefied Petroleum gases. Capacities for every family requirement . . . from 20 to 75 gallons, plus a high recovery, multi-flue, Booster Type designed for use where an extremely large and constant supply of hot water is necessary.

Get set for more sales! We'll be glad to give you full details on the PERFECTION merchandising plan. Your copy is ready . . . write us today! PUSH PERFECTION!

can Petroleum Institute was the first speaker heard. His subject: Is End Use Control of Oil and Gas in the National Interest? He was followed by R. B. Anderson, president of the association, who discussed trends affecting the oil industry in Texas; William T. Tierney, Texas Co. (New York) researcher, who explained the "octane-less" engine he helped develop which cuts fuel consumption; William J. Murray, chairman of the Texas Railroad commission, who discussed price as a factor in the conservation of natural gas; and Brig. Gen. Robert J. Smith, vice chairman of the National Security Resources board, who explained federal plans for use of strategic resources in military emergency periods.

Rocky Mountain Association Has Birthday; Whitelaw Speaks

H. Leigh Whitelaw, GAMA managing director, was principal speaker at the Rocky Mountain Gas Assn.'s seventh annual anniversary banquet in Denver, Sept. 18. Several hundred delegates—manufacturers, contractors, dealers, architects, and utility company representatives — gathered to hear Mr. Whitelaw's predictions as to the future of the appliance and equipment business.

Mr. Whitelaw said in his address that the continuing growth of the appliance manufacturing industry is largely dependent upon the present questionable availability of steel. Although the requirements of the industry are small when compared with total U.S. demand, the emergency situation—with attendant emphasis on a supply of steel for defense preparations—makes it obvious that some restrictions in availability are to be felt by manufacturers. With the elimination of panic buying and the building up of big inventories, Mr. Whitelaw believes that such restrictions won't be necessary until late next year. As to other factors in the expansion of gas appliance manufacturing, GAMA's managing director pointed to the huge increases in shipments of products during 1949. Such shipments, of all types of appliances, increased in averages from 50% to 100% over 1948 totals.

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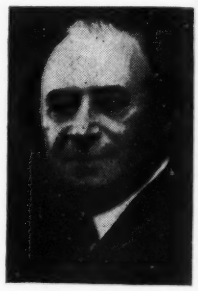
New Jersey Gasmen Select Phillips New President

R. H. Phillips Jr., general manager of the gas department, Public Service Electric & Gas Co., Newark, was elected president of the New Jersey Gas Assn. at the organization's annual meeting, Sept. 8, in Spring Lake.



R. H. Phillips

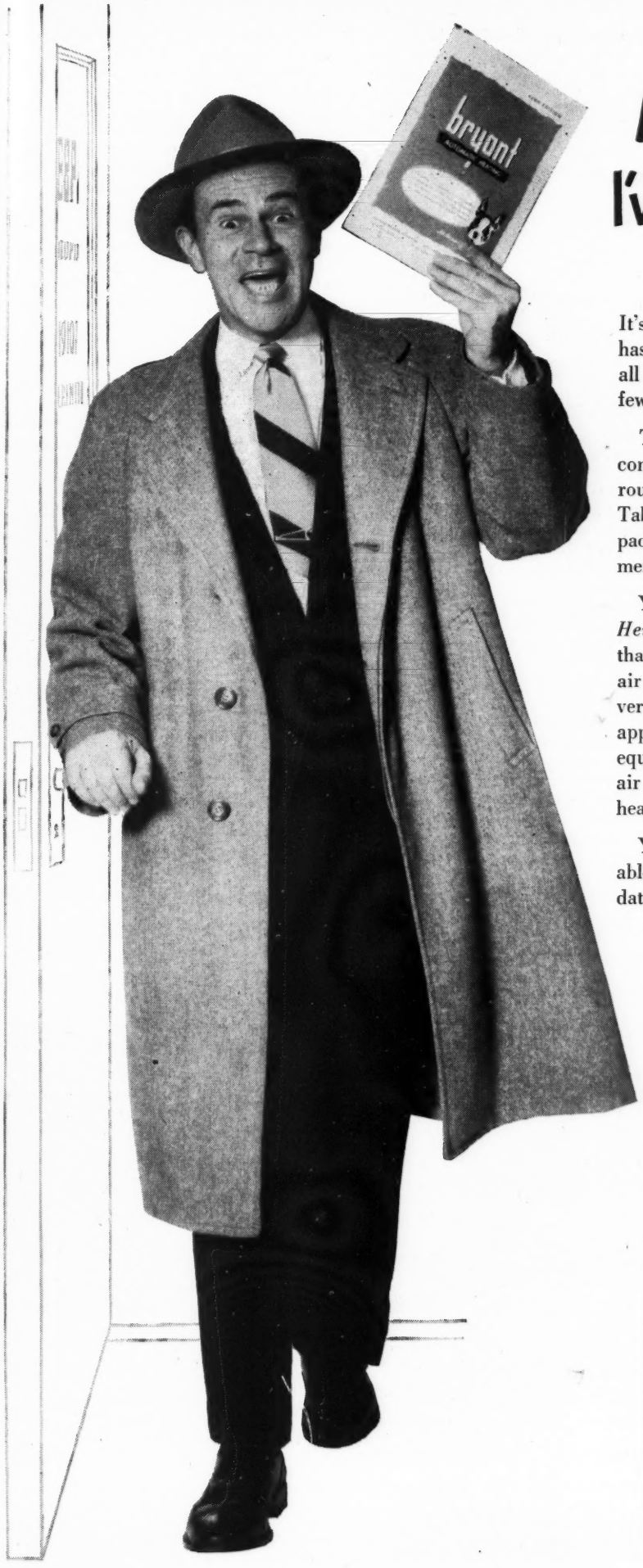
Mr. Phillips moves up to the top executive post from his former office of first vice president. Among the new association officers who will be serving with him are Halsey D. Polhemus, Jersey Central Power & Light Co., first vice president; Vernon F. Stanton, South Jersey Gas Co., second vice president; and Elmer A. Smith, Public Service Electric & Gas Co., secretary-treasurer.

Five Full-Day Forums Added To Natural Gasoline Program

Five forums covering operational phases of the natural gasoline industry will be a special feature of the 25th anniversary meeting of the California Natural Gasoline Assn. Nov. 9 and 10 in Los Angeles. These panel discussions will comprise the first day's program, preceding the usual presentation of formal papers.

M. L. Arnold

M. L. Arnold, Richfield Oil Corp., Los Angeles, general chairman of the conclave, announced inclusion of the forum program. Discussion topics and the names of the leaders of each are "The Efficient Operation and Maintenance of Plant Equipment," J. B. Taylor, Signal Oil & Gas Co.; "Application of Chemical and Process Engineering Principles to the Effiicent Design and Operation of Natural Gas Processing Plants," C. D. Gard, Union Oil Co.; "The Role of the Chemist and Laboratory in Efficient Natural Gas Operation,"



Man..the things I've got to tell you!

It's mighty encouraging news the Bryant distributor has for you. Word on new products, new features, all to help put better installations on your mains, fewer service calls on your switchboard.

Take the big story of the new Bryant all-weather conditioner, the packaged unit which brings year-round heating and cooling for America's homes. Take the new hideaway forced-air furnace, compactly stowed in attic or suspended from basement ceiling.

You'll hear, too, about the 12-gauge Bryant *Hevigage* steel heat exchanger, three times thicker than AGA requirements, featured in Bryant winter air conditioners. You'll like the wider line of conversion burners that includes a new model for applications up to 1,500,000 Btu. And there's equally good news on Bryant boilers, gravity warm-air furnaces, floor furnaces, unit heaters, space heaters and water heaters.

You'll find all the facts in the new catalog, available through your Bryant distributor. So, make a date now with *the man who's got things to tell you!*

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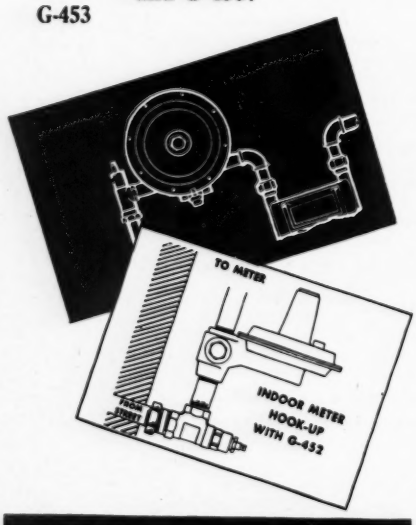
G-453 for G-452

Natural Gas

G-452

G-453

These WELSBACH-Kitson High Pressure Service Gas Valves are naturals for use with natural gas. These valves are tamper proof. Component parts cannot be disturbed without removal of the complete valve from the line. For valves that are rugged and dependable for use with natural gas, get WELSBACH-Kitson High Pressure Service Gas Valves G-452 and G-453.



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W. W. Robinson Jr., The Texas Co.; "The Efficient Mechanical Design of Natural Gas Processing and Compression Plants and Natural Gas Gathering and Distribution Systems," M. W. Kibre, General Petroleum Corp.; and "The Efficient Management of Natural Gas and Natural Gasoline Operations," William A. Kirk, California Southern Oil Co.

All forums, which will include half a dozen talks by industry experts, will run concurrently in all-day sessions.

Reeves Stumps for Sales Department at OUA Meeting

"Competition faces the gas industry every day," D. W. Reeves, Tulsa, told the gas division of the Oklahoma Utilities Assn. at its annual meeting in the Biltmore hotel, Oklahoma City, Sept. 22.

"If you don't believe it ask yourselves these questions. Are we getting all of the business in our territory? Are we losing any business? Are we selling a single service which is not in a competing field with some other service? Does a gas company need a sales department?

"I say that it does."

He proceeded to enumerate some of the fuels which are competing with the gas companies.

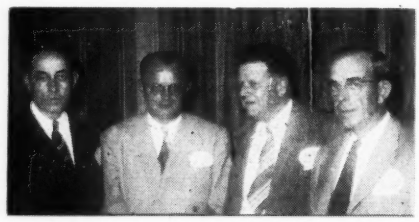
The program of the one-day meeting was well balanced between management and technical problems. Included in the latter class was a paper on the latest methods of leakage control in distribution by Charles D. Taft, superintendent of construction and maintenance, The Gas Service Co., Missouri division. Said Mr. Taft:

"I have found that the leaks which make the lost and unaccounted figure soar in the low pressure system are the broken services, the broken mains and rusted out services, not the leaking bell and spigot or threaded joints. Therefore if you can control and repair the big leaks through a quick regular survey, your leakage control problem can be solved at a minimum cost."

Another technical subject which commanded much attention was "Use of Radio and Practical Application," presented by two speakers, T. D. Nordin, Motorola Inc., Oklahoma City, and F. H. Mugg, Lawton, division manager of Consolidated Gas Utilities Corp. The former presented the technical features of the subject. Mr. Mugg confined his remarks to the use his company is making of the equipment in company mobile communications in the Southern division. His company now has eight cars equipped with the two-way radio telephone service and expects soon to have 12 cars so equipped and four land stations, with approximately $20,000 invested, he explained.

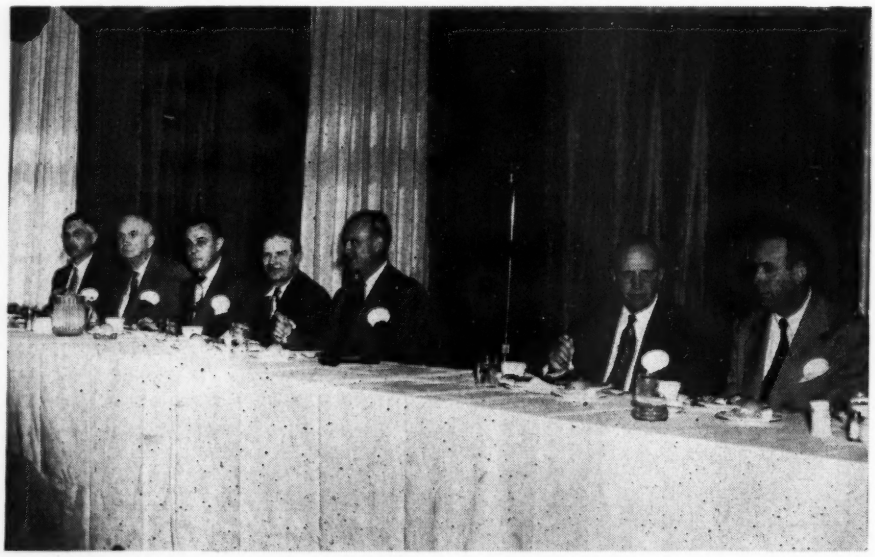
The expanding accounting section of the Oklahoma Utilities Assn. is holding several meetings a year, Oakah Jones, Oklahoma Natural Gas Co., Tulsa, reported.

Some of the phases of the new Oklahoma road regulations relating to trucking were explained by Lt. M. E. Burson, state department of public safety, Oklahoma City.



GASMEN AT OUA included W. L. Woodward, Alva; Charles Taft, Kansas City, Mo.; E. C. Joullian, Oklahoma City; and G. H. Jenkins, Bartlesville.

False impressions that the gas industry is not paying its share of taxes were exploded by J. Y. Wheeler, business consultant of Ardmore, Okla., who enumerated the many forms of taxation levied on natural gas in Oklahoma. He also exposed false statements that most of the natural gas produced in Oklahoma, Louisiana, Kansas, Arkansas, and Texas is being exported to sections outside this area of the Southwest. This region is consuming more than two-thirds of the gas it produces, he declared.



SPEAKERS TABLE at the Oklahoma Utilities Assn. gas division meeting. From left, Earl J. Newlin, State Fuel Supply, Oklahoma City; W. Kemp Walker, Oklahoma Corporation Commission; Carl E. Cloud, Tulsa, chairman of the division; Lauren H. Clegg, Consolidated Gas, Oklahoma City; D. W. Reeves, OUA head; W. H. Carson, University of Oklahoma; and Richard W. Camp, Consolidated Gas.

FINANCIAL

NoNatural, El Paso Win Interim Rate Boosts by Default

The provision in the Natural Gas Act that allows companies to make proposed rate increases effective if hearings on their lawfulness are not completed within five months of their suspension by FPC was taken advantage of by two companies last month. El Paso Natural Gas Co. and Northern Natural Gas Co. filed appropriate motions, and pending rate increases became effective as of Oct. 1 and Sept. 27, respectively.

El Paso's increase will bring in $2.465 million more annually (a 12% boost) from wholesale sales of gas to Southern Counties Gas Co. and Southern California Gas Co., both of Los Angeles. SoCal had just won an increase itself.

Northern Natural will gain an amount estimated at $3.2 million annually from its rate increases on gas sold to 28 distributing companies in 230 communities in five states.

Both companies were required to furnish a $250,000 bond to make the rate increases effective, and both are required to keep accurate accounts of revenue derived from such increases. In the event that final decisions as to the lawfulness of the schedules is negative, the companies are required to return to their customer companies the amount determined to be unreasonable, plus 6% annual interest.

Natural Booms Baltimore Sales

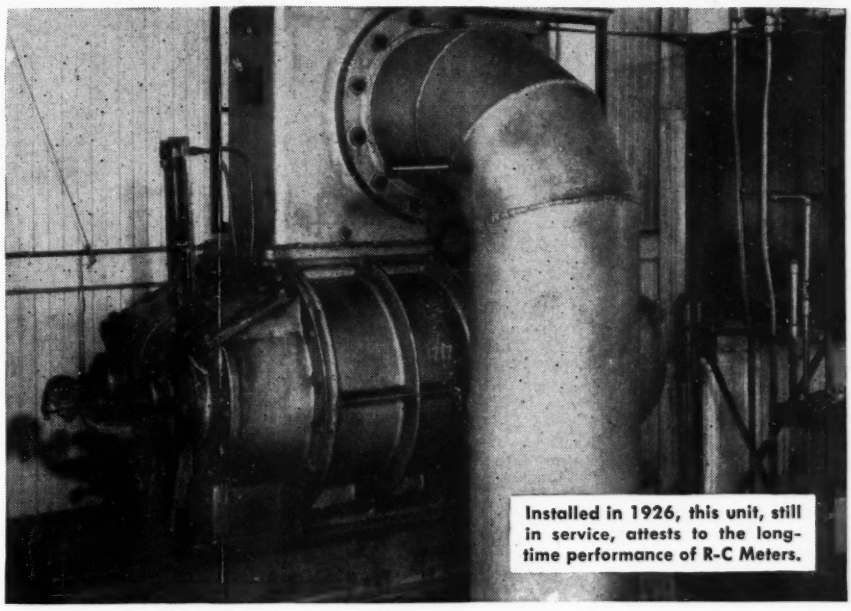
Consolidated Gas Electric Light & Power Co., Baltimore, is already feeling the added glow in the revenue department that comes to a company when it gets natural gas.

President Charles P. Crane, in a quarterly letter to stockholders, pointed up the trend: sales of gas by the company were up 14% for the first eight months of 1950 as compared with that period of a year ago, total revenues increased by $4.9 million, contracts for 528 Mcf per hr have been obtained from new commercial and industrial customers (twice as much volume as was ever obtained before in an eight-month period), and 7000 additional residential furnace installations were ordered—nearly half the total number of residential househeating customers the company had as of Jan. 1, 1950.

TGT Buys Control of Sterling

Tennessee Gas Transmission Co., Houston, acquired complete control over Sterling Oil & Gas Co. as a result of stock exchanges which transpired last month.

Under the exchange, Tennessee Gas offered one-fifth of a share of Tennessee Gas common stock for each of the 133,333 shares of Sterling common purchaseable through exercise of outstanding 10-year warrants previously issued by Sterling, and 1⅓ shares of Tennessee stock for each outstanding share of Sterling common.



Installed in 1926, this unit, still in service, attests to the long-time performance of R-C Meters.

NO PENSION FOR THIS OLD-TIMER even after *23* years of service

Accurate and dependable as always, this 23-year-old Roots-Connersville Meter still performs faithfully. No retirement for this veteran! Because new demands called for higher capacity, it has been transferred to another job in the same plant. Its old duties have been taken on by a new R-C unit, purchased because of fine performance of this old-timer.

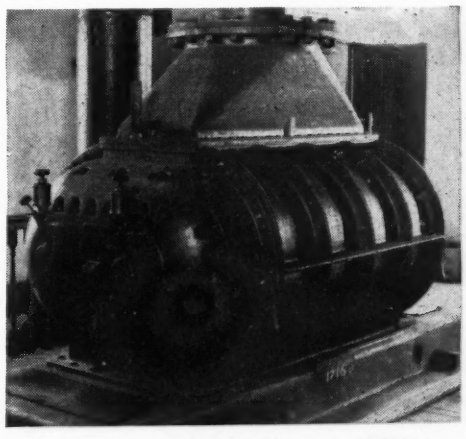
That's a common history of R-C Meters. They're built to measure accurately, and keep on doing it, year after year. Simple design, finely machined measuring surfaces and other important refinements account for their ability to measure gas accurately and unfailingly, almost indefinitely.

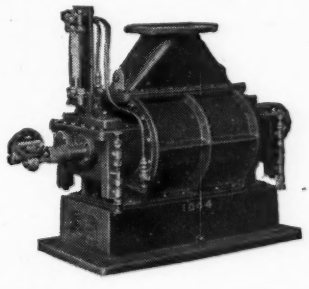
With 31 standard sizes and capacities from 4,000 to 1,000,000 cfh, R-C Meters meet the needs of most applications. Write for Bulletin 40-B-14 or tell us your specific requirements.

ROOTS-CONNERSVILLE BLOWER CORPORATION
511 Oregon Avenue, Connersville, Indiana

(Right) This R-C Meter, with capacity of 317,000 cfh, replaced the "old-timer" above, now transferred to other duties.

(Below) Typical small capacity R-C Meter for low and medium pressures.





ROOTS-CONNERSVILLE
BLOWER BUILDERS R-C SINCE 1854
ONE OF THE DRESSER INDUSTRIES

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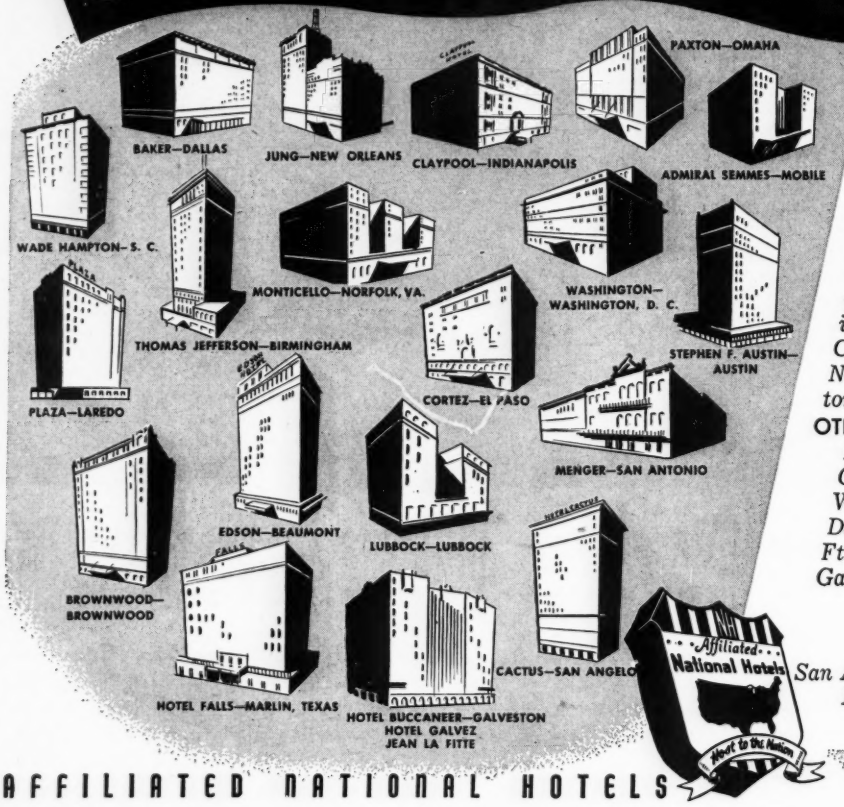

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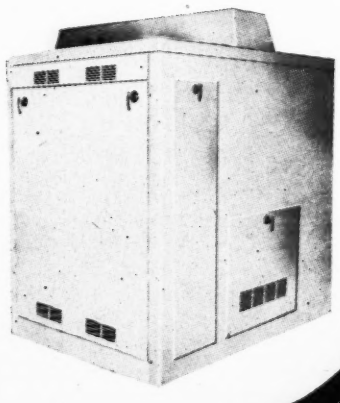

• The gas industry can do their bottling, brewing and dairy plant customers a big favor by recommending the Evans Automatic Heating Unit. This unit provides fully automatic solution temperatures for bottle washing machines . . . saves the user money, time, trouble . . . makes obsolete coal or oil-fired boiler operation. Write us for complete information.

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Gas Companies Garner Annual Report Awards

New York State Electric & Gas Corp.'s annual report for 1949 was judged "the best in the East" in the annual competition sponsored by *Financial World* magazine. The company will be presented with an "Oscar of Industry" at the magazine's annual banquet, to be held this year Oct. 30 in New York City.

Long Island Lighting Co.'s report took second honors for the section in the competition and Consolidated Edison Co. of New York was third.

Citizens Utilities Co., a Greenwich, Conn. company that operates facilities throughout the West, was the winner of the western regional contest.

"Best in the natural gas industry" was the honor accorded to the annual report of Texas Gas Transmission Corp., and Providence (R.I.) Gas Co. received a certificate of highest merit for its report.

Rate Skeds Approved for TGT

Rate schedules submitted by Tennessee Gas Transmission Co. for its northern (Ohio and Pennsylvania) and New York rate zones have been allowed by a recent FPC action. Transmission of gas to and for the account of Manufacturers Light & Heat Co., Pittsburgh, was also okayed. Both approvals were on an interim basis.

The commission rejected proposed service agreements under the schedules covering the northern and New York zones because they failed to conform to requirements. The rejected service agreements were related to TGT service to East Ohio Gas Co., Equitable Gas Co., Pennsylvania Gas Co., Peoples Natural Gas Co., United Natural Gas Co., and Iroquois Gas Co. TGT will deliver 61.148 MMcf of gas daily to Manufacturers, to be received in West Virginia.

Financial Footnotes

Milwaukee Gas Light Co. has asked the Wisconsin Public Service commission for authorization to issue $36 million worth of securities. The funds will be used to finance expansion of the company's distribution system. This expansion has become necessary because of the increased demands on the

Sorry, Gas Is Safe

The trouble with natural gas is that it's just too nice.

At least that's the idea that the Bureau of Sanitation of the city of Richmond, Va. has—natural won't do the job for the city dog pound that manufactured gas used to do. The bureau, under pressure by the Society for Prevention of Cruelty to Animals, must find another agent to dispose of vagrant unclaimed canines in a humane manner.

Natural gas just isn't toxic; that's how Richmond's unique conversion problem was posed.

A SIMPLE SOLUTION for one of the GAS INDUSTRY'S *most trying problems*

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BELL JOINT CLAMP

SOLVES YOUR JOINT REPAIR PROBLEMS

6 inch Normac Clamp being lowered into hole for installation

6 inch Normac Clamp in service after installation

QUICK • EASY • PERMANENT

Installed in small pavement openings. Available in all standard sizes from 3" to 12". A simple set of tools cleans the joint, installs the clamp . . . often in only a quarter of an hour. SAVES TIME. SAVES MONEY and the repair is permanent. Designed for all conditions particularly where pavement repair costs are prohibitive. Such small opening repairs are scarcely noticeable when pavement is replaced.

Normac Clamps can be installed in large as well as small openings.

Norton - McMurray hold definite leadership in the development of methods for installation and rehabilitation work through small openings. We welcome the opportunity to help solve a problem you may have—tell us about it.

Write for our catalog describing our complete line of COUPLINGS . . . FITTINGS . . . SERVICE TEES and ELLS . . . SLEEVES . . . COMPRESSION-END COCKS . . . METER BARS and BRASS FITTINGS for copper pipe.

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CALENDAR

NOVEMBER

National Hotel Exposition—Grand Central Palace, New York, Nov. 6-10.

Wisconsin Utilities Assn. Gas & Electric Section Convention—Schroeder hotel, Milwaukee, Nov. 8-10.

Mid-Southeastern Gas Assn.—The Sir Walter hotel, Raleigh, N. C., Nov. 9-10.

American Petroleum Institute Annual Meeting—Los Angeles, Calif., Nov. 13-16.

New Jersey Utilities Assn. Annual Meeting—Seaview Country Club, Absecon, N. J., Nov. 17-18.

American Society of Mechanical Engineers Annual Meeting—Hotel Statler, New York, Nov. 26-Dec. 1.

AGA-SGA Employee Relations Conference—New Orleans, Nov. 27-28.

DECEMBER

The American Society of Refrigeration Engineers—Hotel Commodore, New York, Dec. 3-6.

Institute of Cooking and Heating Appliance Manufacturers Semi-Annual Meeting—Cincinnati, Dec. 4-6.

JANUARY 1951

AGA Home Service Workshop—Hotel Statler, Washington, D. C., Jan. 3-5.

Pipe Line Contractors Assn. Annual Convention—Shamrock hotel, Houston, Jan. 9-10.

MARCH

Mid-West Gas Assn.—Hotel Fontenelle, Omaha, March 12-14.

National Assn. of Corrosion Engineers Conference & Exhibition—Hotel Statler, New York, March 13-16.

Gas Appliance Manufacturers Assn. Annual Meeting—The Homestead, Hot Springs, Va., March 19-21.

New England Gas Assn. Annual Meeting—Hotel Statler, Boston, March 29-30.

APRIL

AGA Sales Conference on Industrial & Commercial Gas — Shoreham hotel, Washington, D.C., April 2-4.

Mid-West Regional Gas Sales Conference, Residential Gas Section—Edgewater Beach hotel, Chicago, April 9-11.

Southwestern Gas Measurement Short Course—University of Oklahoma, Norman, April 10-12.

AGA Distribution, Motor Vehicle, and Corrosion Conference—Hotel Peabody, Memphis, April 16-18.

Southern Gas Assn. Annual Meeting—Biloxi, April 23-25.

National Conference of Electric and Gas Utility Accountants—Hotel Sherman, Chicago, April 23-25.

Indiana Gas Assn. — French Lick Springs, French Lick, Ind., April 26-27.

MAY

AGA Natural Gas Department Spring Meeting—Dallas, May 7-8.

National Resturant Exposition—Navy Pier, Chicago, May 7-11.

AGA Production and Chemical Conference—Hotel New Yorker, New York, May 14-16.

AGA Industrial and Commercial Gas Section Industrial Gas School—William Penn hotel, Pittsburgh, May 14-18.

Pennsylvania Gas Assn.—Wernersville, Pa., May 15-17.

Public Utilities Advertising Assn. Convention—Hotel New Yorker, New York, May 17-19.

JUNE

Institute of Cooking and Heating Appliance Manufacturers Annual Meeting—Cincinnati, June 5-6.

AGA Executive Conference—Greenbrier hotel, White Sulphur Springs, W. Va., June 11-12.

Canadian Gas Assn.—Bigwin Inn, Lake of Bays, Ontario, Canada, June 18-21.

SEPTEMBER

Pacific Coast Gas Assn. Annual Convention — Fairmont hotel, San Francisco, Sept. 4-6.

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Proven Over 15 Years of Actual Use

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Peerless Odorizers are designed to automatically maintain an accurate odorization rate during variations of flow, temperature, and pressure. They provide maximum efficiency with a minimum of maintenance.

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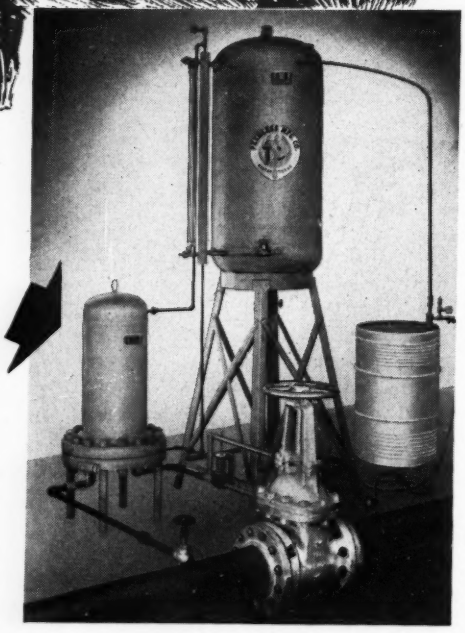

A typical installation of a Peerless Type "M" Odorizer.

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AGENTS IN: Houston, Odessa, Wichita Falls, and El Paso, Texas. Tulsa, Denver, Phoenix, Los Angeles, Boston, Philadelphia, Cleveland, New York City, Buffalo, Chicago, Richmond.

company for househeating gas. The company has made 9000 heating installations this year, is making about 450 more each week, and expects to have 22,000 space-heating customers by year's end.

All outstanding stock of four Oklahoma utility companies will be acquired by Oklahoma Natural Gas Co. Stockholders of the company recently authorized issuance of 32,000 shares of common stock, to be exchanged for stock of Guthrie Gas Utilities Co., Kingfisher Gas Co., Oklahoma Central Gas Co., and General Fuel Corp.

MANUFACTURERS

M-H Takes Over Domestic

Domestic Thermostat Co., Los Angeles, has been dissolved and its assets distributed to stockholders, it was announced by M. M. Kennedy, president, last month.

Domestic's plant and equipment were sold by stockholders to Minneapolis-Honeywell Regulator Co., Mr. Kennedy said. He anticipates that the manufacture of Domestic's hot water heater controls will continue without changes of personnel.

Automatic Opens Canada Branch

Automatic Products Co., Milwaukee, has announced acquisition of a manufacturing plant in Cooksville, Ont., in which it will start making and assembling its line of controls.

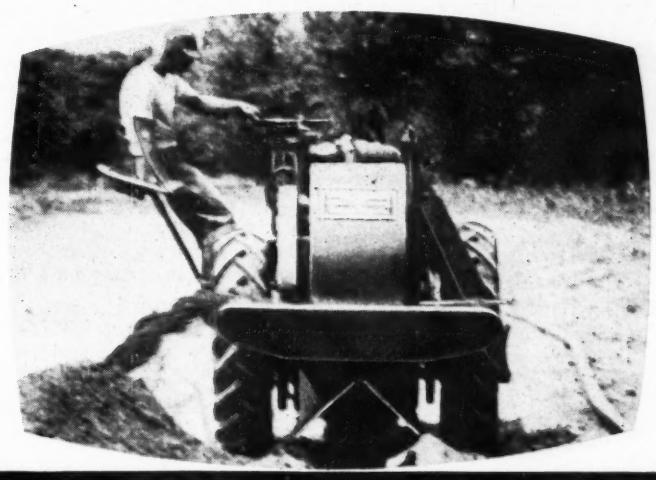
E. A. Vallee, executive vice president, announced the purchase of the facilities from Durham Fabrics Ltd. The American company will use it for production of gravity-fed oil burner controls, commercial refrigeration controls, and gas controls.

Remy H. Ludwig has been appointed Automatic's Canadian manager, and he will direct operations of the new plant.

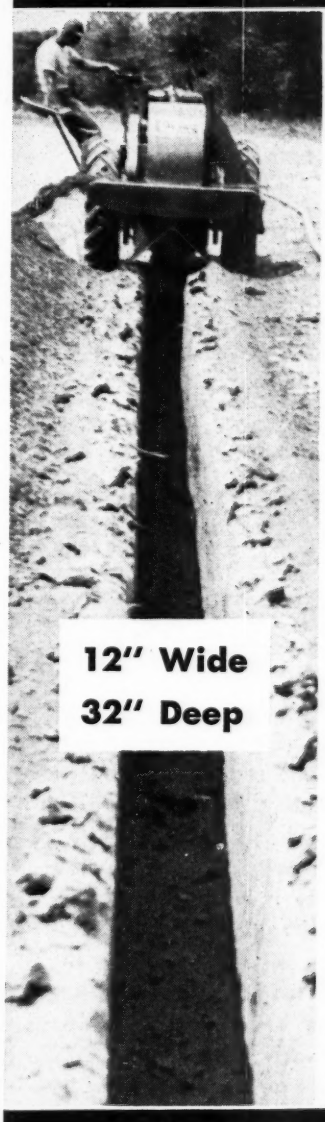
Newsnotes

Controlling interest in the American Gas Machine Co., Albert Lea, Minn., has been acquired by Queen Stove Works Inc., also of Albert Lea, according to an announcement early this month. American Gas Machine manufactures gas space heaters, heating stoves, furnaces, and water heaters; Queen Stove makes space heaters, blowers, forced-air furnaces, conversion burners, water heaters, and floor furnaces. Queen Stove's officers have assumed corresponding positions in American Gas Machine, but John W. Baillie, former president of American Gas Machine, stays on "for a time" as chairman of the board of that company.

Its fifth anniversary of service to the LP-Gas industry was marked by United Petroleum Gas Co., Minneapolis, last month. The company serves the industry with product and equipment designs, engineering consultation, transportation, storage, and handling facilities, and gas.



Digging 1400-foot ditch



IN 2½ HOURS

The illustration shows a Longhorn Mobile Ditcher at work on a real estate development in Owensboro, Kentucky. The job illustrated was a 12" wide, 32" deep ditch. This 1400-foot ditch was dug in 2½ hours.

The new improved Model "B" Longhorn Mobile Ditcher has many added values that mean increased utility, operating economy, performance and dependability, and minimum maintenance cost.

Power increased 25%. More weight. Frame is heavier — reinforced and strengthened. Anti-friction bearings and heat-treated gears assure smooth performance.

The Longhorn Mobile Ditcher is one-man operated. All controls, including hydraulically operated hip action, are within easy reach of operator. Widely used for distributor main and service extension jobs. Readily moved under its own power from one work area to another.

There are numerous other features of a Longhorn Mobile Ditcher *that it is to the interest of you and your company for you to know about.* Please ask us.

LONGHORN INDUSTRIES, INC.
Henderson, Texas Phone 1035

NEW IMPROVED MODEL "B"
Longhorn Mobile Ditcher

REGULATION

Michigan Supreme Court Rules Against Panhandle Direct Sales

The Michigan supreme court has ruled 5-3 that direct sales of natural gas by Panhandle Eastern Pipe Line Co. to the Ford Motor Co. in Dearborn are illegal.

The decision adds another chapter to litigation that dates back to 1945. At that time, Panhandle entered into a contract with Ford for direct delivery to the company, despite the fact that a franchise for serving gas to the Dearborn area is held by Michigan Consolidated Gas Co. When the contract was signed, Michigan Consolidated filed a complaint with Michigan Public Service Commission, which promptly issued a cease and desist order against the direct sale, saying that direct sale required a cerificate of public convenience and necessity. Panhandle then appealed the case to the Ingham county court, which issued an injunction restraining the public service commission from interfering with Panhandle's sale of gas to Ford.

Then, the public service commission, together with Michigan Consolidated, took the case to the supreme court. The court said no to Panhandle last month.

Meanwhile, Panhandle is still awaiting an FPC decision on a petition it submitted for an okay to sell 55 MMcf of gas daily direct to Ford.

Washington Rate Increase Goes to Appeal Court

The Washington, D.C. court of appeals took over the case of Washington Gas Light Co.'s much-contested, year-old proposed rate increase last month. The increase, first granted by the District Public Utilities commission in November 1949, then set aside by District Court Judge T. Alan Goldsborough last June, has been contested hotly.

Crux of the dispute is $1.744 million worth of abandoned property, which the public utilities commission allowed the company to include in the $32-million rate base on which it was to receive a fair return. The Federation of Citizens Assn., chief complainant, and Judge Goldsborough both disagreed, saying that for the commission to allow abandoned property to be included in the rate base was "cynical, arbitary, and illegal."

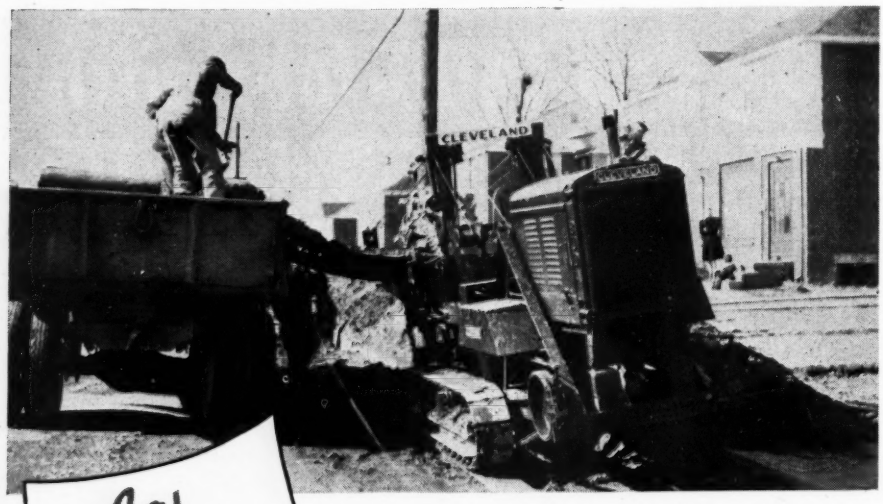
Milltown Loses Case; Transcon Line Goes Through

The little borough of Milltown, N. J., a tiny voice crying out against the roar of majority approval of natural gas for the East, has had its cry silenced.

A federal court injunction restraining the borough from interfering with construction of Transcontinental Gas Pipe Line Corp.'s 30-in. line from Texas to New York has been issued. The line has to pass through Milltown.

Earlier, the city fathers of Milltown had ordered construction crews to cease and desist in their building of the pipeline through the community's property. It violated a zoning law, they said, and besides, it would be a menace to health and safety.

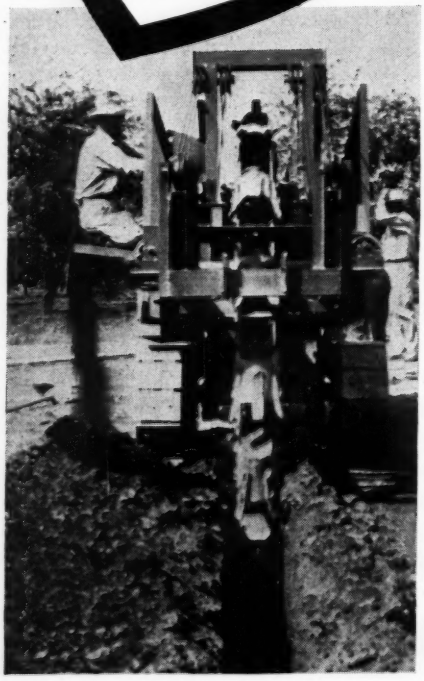
Federal Judge Forman, presiding at Trenton, didn't think so, however. He said that the risk of having a big pipeline underfoot is



Gas Extensions ...services too!

CUT YOUR MACHINE INVESTMENT WITH VERSATILE

CLEVELAND TRENCHERS



Here's how to stretch your equipment dollar—do all your distribution trenching with one machine... the CLEVELAND "Baby Digger" Model 92. Trench depth: up to 5 full feet. Trench widths: from 10" to 20". Compact and highly maneuverable, it works handily in the tightest places, puts the edge of a 20" trench within 17" of a side wall. Loading on or off its tilt-bed "T-5" trailer in 5 minutes, it jumps quickly between jobs. Like its famous bigger brothers, the "92" is dependably fast and rugged. Year 'round digging season. See your distributor today.

THE CLEVELAND TRENCHER CO.
20100 ST. CLAIR AVE., CLEVELAND 17, OHIO

A REAL PROMOTIONAL "TIE-IN." It's Round Up time in Brooklyn again, so vice president Hugh Cuthrell ropes a pair of rodeo queens to help Brooklyn Union kick off its annual campaign. The girls are from the Madison Square Garden rodeo, which opened in late September.

Representatives of each of the winning gas companies in the Big Six campaign are shown here with W. Paul Jones, president, Servel, Inc., sales contest sponsor. From left, W. C. Dahlmann, Houston Natural, Beeville, Texas; Homer Pollan, Peoples, Chicago; Jonathan Youk, Southern Union, Carlsbad, N. Mex.; Mr. Jones; Jack Frost, Brooklyn Union; F. S. Thomas, Manufacturers, Pittsburgh; J. F. Topping, Peoples Water & Gas, Ft. Lauderdale, Fla. **(For news of Big Six, see p. 28.)**

just one of the calculated risks that big cities and small cities have to take in order to get on with the important business of progress.

The pipeline will go through, or rather under, Milltown.

Lone Star in Patent Suit

Lone Star Gas Co., Dallas, is asking federal courts to issue an injunction to keep Stewart-Warner Corp. of Indiana from installing a draft equalizer feature in its furnaces which Lone Star says it patented in 1937. The utility is also asking damages.

The device in question is designed to keep a wall-furnace pilot light from blowing out. Lone Star and the company which makes the equalizer for Lone Star, Consolidated Gas & Equipment Co., are claiming that Stewart-Warner is installing the patented device on its wall furnaces.

London Gas Strike Ends

A wildcat gas works strike that shut off the gas for London and surrounding areas for 21 days, ended Oct. 9. The British navy was called in finally, and it took over operations of the gas works until the strike was ended.

Ten strike leaders were sent to jail for their part in organizing the illegal work stoppage, which had as its aim a three-pence-per-hour pay increase.

The strikers went back to work on the condition that none would be fired, that the troops would be withdrawn, and that immediate negotiations for a bonus pay plan would be started.

MISCELLANY

Central Hudson Looks Back

A thousand employees of the Central Hudson Gas & Electric Corp. shed their modern day dress for turn-of-the-century costume in September, and rolled through Newburgh, N. Y. in horse-drawn shays to celebrate the company's 50th anniversary.

In Newburgh armory, converted into a street-scene more typical of 1900 than today, they entered into a large celebration in behalf of the organization that expanded from a three-horse company to today's $60-million firm that serves 36,200 gas customers.

Ernest H. Acker, president and grandson of founder William R. Beale, and John Wilkie, vice president and treasurer and son of co-founder John L. Wilkie, were present at the ceremonies.

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Richmond Switches Over— From Natural to Manufactured

Here's a switch—the city of Richmond, Va. recently converted 350 furnaces from natural gas to manufactured gas use.

The city didn't want to, though. A cold snap happened to Virginia in September—very unusual—and it caught the city with its conversion burners down. The city had been told it would get natural by Sept. 1, and, anxious to have heating facilities ready to receive it, Richmond's department of public utilities started converting furnaces. It had converted 900 when the cold snap came.

This accounted for three of Richmond's 17 meter districts, and residents in those three districts felt the cold badly. Despite persuasion, 350 of them demanded reconversion to manufactured.

Three Companies Sponsor New Television Shows

Three gas companies have added new television shows to their advertising schedules. Brooklyn (N.Y.) Union Gas Co., which has already enjoyed success with an afternoon TV show, on Oct. 2 began sponsoring "New York Close-Up," a weekly starring Tex McCrary and Jinx Falkenburg.

Every Monday evening, Dayton Power & Light Co.'s audience sees "Yesterday's Newsreel," a look at big events of the 20th century. The show began Sept. 25. Cincinnati Gas & Electric Co. chose half-hour dramatizations of classical and semi-classical stories for its "Story Theater." First seen in Cincinnati Oct. 9, the weekly shows were filmed in Hollywood.

Newsnotes

Chemical Plants Division of Blaw-Knox Co., Pittsburgh, will design and construct plants to recover light oil from high-Btu oil gas for the Cambridge (Mass.) Gas Light Co., and the New Bedford (Mass.) Gas & Edison Light Co. Removal of the light oil eliminates condensation from the gas lines, thereby reducing the possibility of service interruptions, and also salvages a commercially valuable by-product.

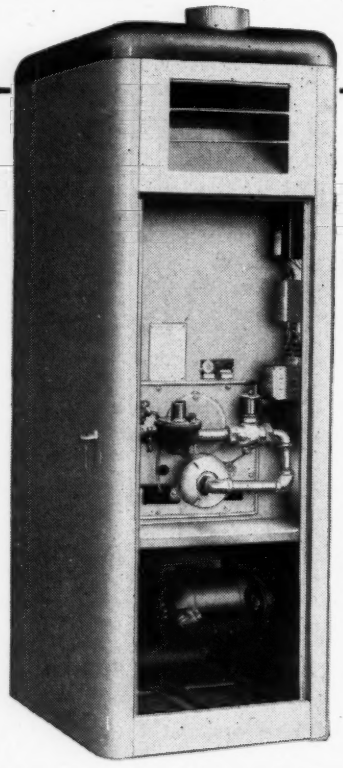
Oklahoma Natural Gas Co. has started construction of a new $750,000 service building in Oklahoma City to house city plant facilities, border station, warehouse, garage, machine shop, meter shop, and offices.

Philadelphia Electric Co. won the AGA annual accident prevention award last month. Basis of the commendation was the 25% accident reduction achieved by the company in 1949 under the total for 1948.

Texas Gas Transmission Corp.'s 24-minute color film "Underground Highway" is now available for showing by club groups and other organizations, the company has announced. The film describes Texas Gas' $73.5 million gas pipeline from Arkansas to Indiana. Prints are obtainable without charge through Texas Gas Transmission Corp., Owensboro, Ky.

"Texas Tessie," who made her debut at the Atlantic City convention last month, has joined the other symbolic figures which help tell the gas story in national, regional, and local publicity. Harry Volk Jr., creator of the newest symbol, bills Tessie as "America's favorite flame" in his promotion, and claims that several utilities have adopted her as their official emblem.

LOW or HI-BOY...



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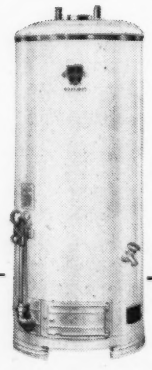

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Also manufacture the famous Security Heavy Duty Water Heater and full Line of Gravity, All-Purpose, and In A Wall Furnaces and Conversion Burners.

A CORRECTION

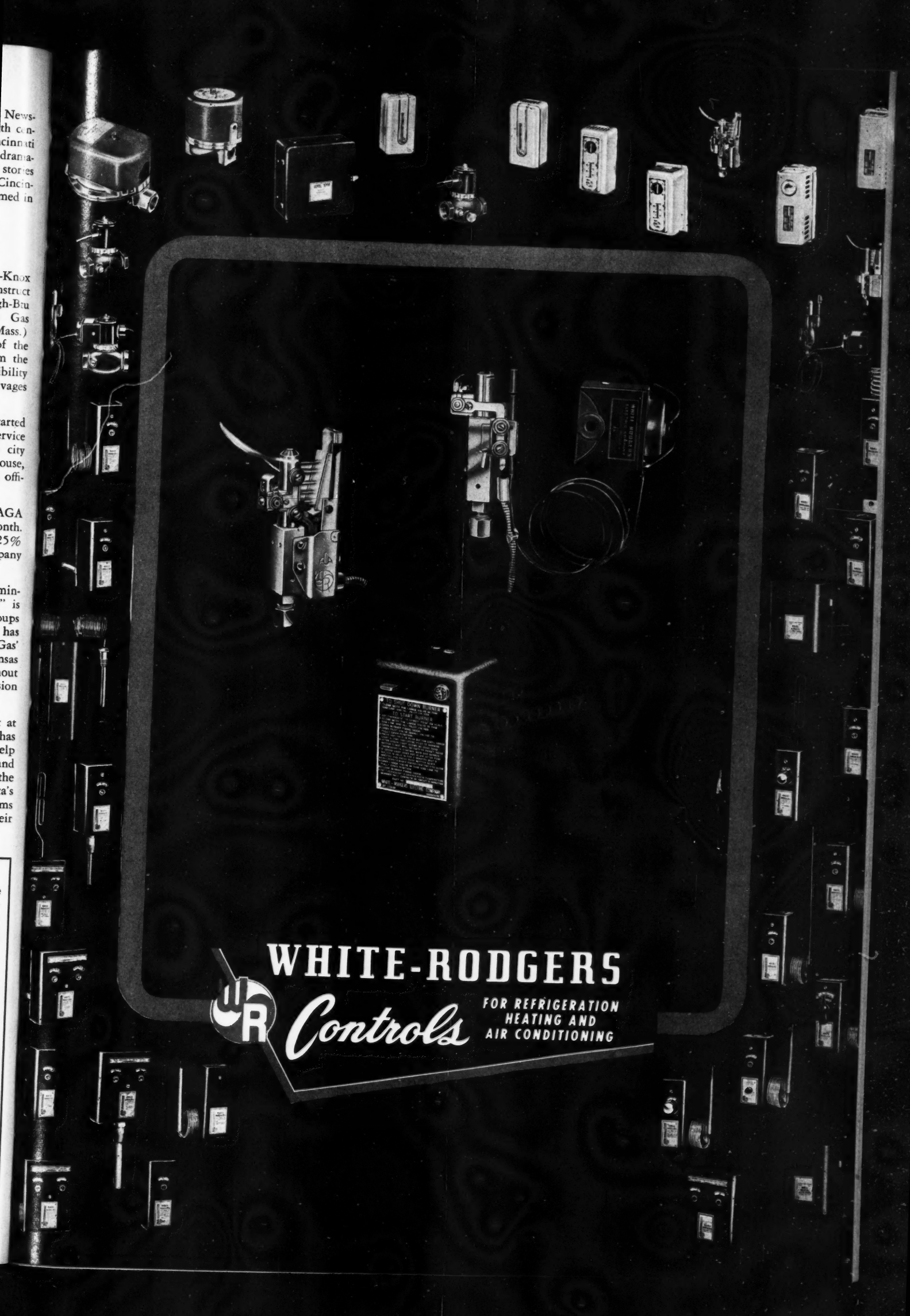
Unless readers of October GAS were very sharp, they must have been confused by the following statement, appearing on p. 59 in the article "A Comparison Between Atmospheric and Forced Draft Burners."

"Refer back to Fig. 1 and 2, and for the sake of this example assume equal burner frontal inputs, the pressure drop from the areas. It is seen then that, for identical inputs, the pressure drop from the burner air chamber to the firebox must be identical for both burners."

Our linotype operator was stuttering. Try it this way:

"Refer back to Fig. 1 and 2, and for the sake of this example assume equal burner frontal areas. It is seen then that, for identical inputs, the pressure drop from the burner air chamber to the firebox must be identical for both burners."

Our apologies to the author and to those readers who wondered what it was all about.


WHITE-RODGERS
Controls
FOR REFRIGERATION
HEATING AND
AIR CONDITIONING

CURRENT READING

EXISTING STANDARDS, Their Coverage and Enforcement—Information Letter No. 38 prepared by C. George Segeler and Charles C. Eeles of the committee on industrial gas practices, industrial and commercial gas section, AGA.

In designing their equipment for industrial and commercial applications, the manufacturers of gas appliances are confronted with a great diversity of laws, ordinances, codes, standards and other regulations. Believing that this non-uniformity works a definite hardship on the gas industry in promoting the industrial utilization of gas, as well as on the equipment manufacturers, the section formed a committee to establish industrial gas practices which will provide adequate safety without unduly restricting the use of gas. The long-range objective of this committee is to examine all existing laws, codes, and standards controlling the utilization of industrial and commercial gas, or the installation of facilities for such uses, and then produce recommended practices. These recommended practices will include the desirable features of known codes and exclude unduly restrictive provisions.

In the meantime, there are available a number of carefully prepared valid codes which will serve as a nucleus around which standard practices can be built. These codes are listed in Information Letter No. 38.

RESEARCH IN PILOT BURNER Design, Construction and Performance — This research investigation, designated project DGR-5-B and published as research bulletin No. 57, was sponsored as a PAR activity by the AGA's committee on domestic gas research.

The following conclusions are drawn from the work reported in this bulletin.

1. Studies of factors affecting primary air injection, lifting, yellow tip, and flashback characteristics indicated that contemporary pilot burners generally conform to design principles developed for larger types of atmospheric gas burners. Variations to these principles may occur in the case of venturi type pilot burners.
2. Extending mixer tube length within rather wide limits may decrease injection by only about 3% primary air although this decrease may be about one-third of the effective operating range between normal injection and yellow tip limit curves for natural gas. This characteristic may make possible the use of either short mixer tubes, or pilots having long mixer tubes with primary air openings and orifices outside of the combustion chamber.
3. Straight through vertical flow provides for more primary air injection than straight through horizontal flow and both of these types of flow provide for better injection than when any change in flow direction occurs.
4. Contemporary pilot burners are not necessarily designed for maximum primary air injection. This is indicated by the successful use of dual type orifices which tend to lower injection but which improve air-gas mixing and permit the use of relatively large fixed air openings which are favorable toward the elimination of lint stoppages. However, difficulties may be encountered with dual orifices in some instances. Due to the extremely small orifice size, partial or complete stoppage may occur from foreign particles in the gas and interfere with primary air injection as well as gas flow.
5. As pilot burner metal temperature is increased the first 100°F rise above the average operating head temperature of 250°F causes a greater decrease in primary air injection than any subsequent hundred degree increase until cracking of the fuel gas occurs. Consequently it is important to maintain pilot burner temperature below the cracking temperature of the fuel gas, and the lower the metal temperature the greater the primary air injection. Although cracking temperature of the fuel gas varies with its composition, many manufactured gases crack at temperatures as low as 500°F.
6. By recessing the port on non-aerated pilot burners, the flames have greater stability and are less affected by stray air currents and combustion chamber pressures than those on a non-recessed or raised port.

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PLANNING A CORROSION CONTROL PROGRAM: IV

Review Maintenance Standards and Practice

By A. W. Peabody
Ebasco Services Inc., New York

ON gas distribution systems, a large part of the cost of applying cathodic protection to existing mains and services is the labor involved in electrically insulating the section to be protected from adjacent sections and other metallic structures such as water mains, and clearing accidental contacts with other structures.

Insulating materials, such as insulated flanges or insulating-type couplings in mains, and insulating bushings at meters, could have been installed at very little cost when the mains, services and meters were installed.

One of the first steps in putting a corrosion control program into service is to arrange to have extension and design engineers include these insulating fittings in designs. Installation crews need to be instructed in proper installation and checking of insulating materials. Meter setters and changers need instructions. Maintenance crews need instruction regarding when to insulate and when to "bond-in" sections of lines replaced.

An adequate stock of insulating materials will need to be maintained.

Fortunately, the provision of these insulating materials usually is a step in the right direction (toward reducing corrosion) even though cathodic protection may not be installed or needed for many years.

Electrical insulation of new extensions of steel mains from older steel mains, of steel mains from cast-iron, steel services from cast-iron mains, copper services from steel and cast-iron mains, and galvanized steel services and mains from plain steel and cast-iron is beneficial in reducing galvanic corrosion due to dissimilar metals, and also provides some of the necessary insulated points when it becomes desirable to provide cathodic protection.

If a corrosion control program is to be effective, we must look to our standards or "specs" as one of our first steps to be sure that the "bibles" of the construction and maintenance men contain sound practices, corrosion-wise, consistent with satisfactory progress in reduction of corrosion damage.

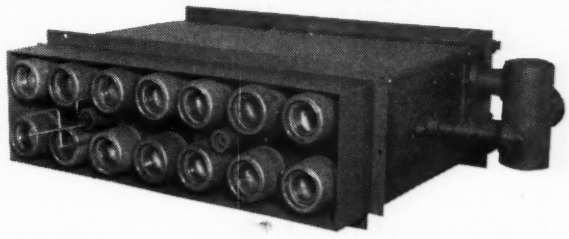
Probably no two of us have sets of standards which are similar but there are certain sections in all of them which should be reviewed by the corrosion engineer to be sure that none of our standard practices is actually contributing (as is often the case) to active corrosion damage. If such is found to be true in your company, it is well worth the cost and trouble to you to eliminate such damaging conditions by revising those practices at fault and training your construction and maintenance personnel in the proper application of these revisions. As has been previously discussed (*GAS*, Aug. 1950, p. 82) it will be necessary to "sell down the line" concerning the reasons for making the changes and how important it is that these practices be carefully observed if corrosion is to be successfully controlled.

Now as to some of the things that we should look for when reviewing the various sections of our standards.

1. *Gas system vs foreign structures:* Are we making ample provision for keeping our gas mains and services from direct metallic contact with water mains and services, lead sheathed cables, service station piping, or any foreign underground metallic structures? Do we specify that our mains and services be laid at least some minimum distance from such structures? Do we specify suitable precautions at points of crossing? If we do not keep free of contacts with other structures, costs of application of cathodic protection to our steel lines will be increased. If our cast iron mains are placed in contact with a foreign steel structure, that foreign structure may be damaged.

2. *Dissimilar metals:* Although we know that dissimilar metals in contact in soil are a notable source of corrosion difficulties, have we recognized that fact in our standards? Do we provide for insulated transition fittings at junction points between steel and cast iron mains? Such are readily available and can save much in reduction of corrosion and in simplifying the application of cathodic protection to the steel mains. Do we provide for insulation at the point of tie-in between steel services and cast iron mains or between copper services and either steel

WEBSTER KINETIC*



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or cast iron mains? Means of providing this insulation are available and can result in substantial long-term savings in corrosive soils. Steel services on cast iron mains will tend to be corroded while mains to which copper services are attached may be strongly attacked.

3. *Insulation at meter setups:* Do our standards provide for insulation of all new meter installations and contain detailed procedures for insulation of existing installations—both residential and industrial? Since in most cases, the customer's gas piping will contact his water piping at some point on the premises (usually a water heater), the steel gas service is then in electrical contact with the cast iron water system, with resulting corrosion of the service, if meters are not insulated. If the water service pipe to the premises is copper and if it and the gas service are laid close together (sometimes in the same ditch) corrosion of the steel gas service can be very rapid. If cathodic protection on steel systems is contemplated, insulation of all meter setups is normally essential in order to confine the protective current to the steel system. Some companies now make it a standard practice to insulate all new meter installations whether cathodic protection is contemplated or not as benefits result in either case. Several different types of insulating fittings are now available and are offered for sale by many manufacturers for use in meter setups.

4. *Electrical continuity of steel mains:* Recognizing the possibility that our steel gas mains and services may be cathodically protected, do our standards provide for keeping all steel systems electrically continuous by bonding across any compression couplings used? This is a quick and simple procedure during construction—but it may be expensive if such couplings, unbonded, have to be later located, uncovered, and bonded when a cathodic protection installation is made.

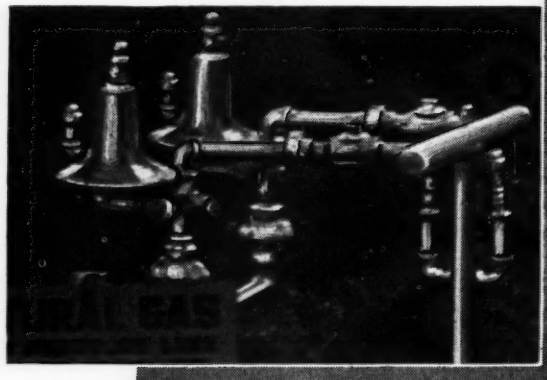
5. *Coating practices:* Are our coating practices sound? Are we guilty of such things as carefully coating all of our steel main but putting no coating whatsoever on cast iron or brass valve bodies connected to that main? Since the steel main is going to try to cathodically protect these valve bodies (and in so doing corrode itself), coating these bare dissimilar metal surfaces will actually do more good than coating an equivalent area of the steel main.

6. *Cased crossings:* If we have any cased crossings on our system, do our standards provide for keeping the casing insulated from the main? If cathodic protection is applied to your mains, which would you prefer to protect, the main or the casing? It can be one or the other but normally not both—if the casing is in electrical contact with the main, the casing will tend to absorb any cathodic protection current at that point and leave the cased portion of main entirely without protection.

7. *Cathodic protection:* If we are planning a corrosion control program, are we also planning a section of our standards which will specify in detail how to do such things as make galvanic anode installations, rectifier ground beds, rectifier installations, install test points, insulate valve flanges, make electrical connections to mains, and all other procedures which are peculiar to cathodic protection work? If our corrosion control program is to be effective, such a section is just as important as any of the sections pertaining to construction and maintenance practices.

A WIDER RANGE

... of Delivery Pressure Control



REYNOLDS HIGH PRESSURE LINE REGULATORS in parallel hookup have an increased range of capacity as well as a wider range of delivery pressure control. This also provides greater margin for emergencies. On inlet pressure the range is up to 650 pounds. For outlet pressure, this unit assures absolutely accurate and dependable control from 2 to 100 pounds. This variance in outlet pressure is made by use of different sizes of diaphram cases and further flexibility in the spring type is possible by use of different strength springs.

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WALDO S. HULL
163 W. Queen Lane
Philadelphia, Pennsylvania

Reynolds Gas Regulator Co.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

Choosing Between Galvanic Anodes and Rectifiers

By H. W. Wahlquist
Ebasco Services Inc., New York

THERE is no sharp dividing line between use of galvanic anodes and rectifiers. It would not be desirable for a company to start a corrosion control program on the basis of standardizing on either one or the other.

There are many factors which influence or dictate the choice of anodes or rectifiers. The principal factors are:

1. Economics
2. Interference with other structures
3. Operating methods
4. Whether lines are bare or well coated
5. Whether lines can be electrically insulated from other lines.

The corrosion consultant or corrosion engineer should consider all these factors and others also.

If the gas system is operated by a gas and electric company, and the cost of power for the rectifier is "out of one pocket into the other," rectifiers may be favored—especially if large values of current are required. Where joint installations of cathodic protection for gas and water piping and electric and communication systems can be made (which usually require large values of current) and the interference problem is eliminated by close cooperation and protection to all structures in an area treated as one unit, rectifiers undoubtedly will be required.

There may be a choice of zinc, aluminum, or magnesium anodes if galvanic anodes are to be used. Each has some advantages. The choice will depend on local conditions.

It appears that a general policy should not be established but let local conditions and economics for each installation control the choice.

(To be Continued.)

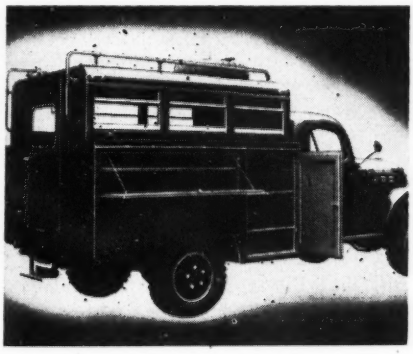
NEW PRODUCTS

Transit Body

POWERS-AMERICAN DIVISION, McCabe-Powers Auto Body Co., 5900 N. Broadway, St. Louis 15.

MODEL: Transit-maintenance truck body.

DESCRIPTION: Arranged to permit comfortable transit for four men, in addition to those in the truck cab, this unit also provides compartment space for carrying a variety of



tools and materials. The body is useful for surveying crews and maintenance gangs, and for transporting extra tools and men to large construction jobs. Compartments may be equipped with shelves, trays, and bins. Inside seating arrangement may be altered to fit individual needs, and the body roof may be fitted with hand rails and straps or with ladder racks and material brackets.

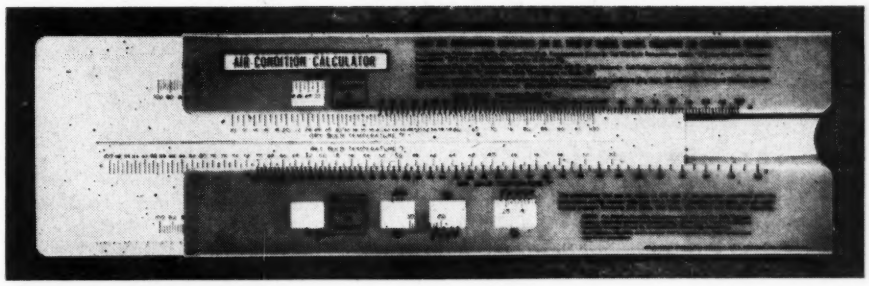
Calculator

CALCULATOR SPECIALTIES CO., 122 S. Michigan Ave., Chicago 3, Ill.

MODEL: Air conditioning calculator slide rule.

APPLICATION: To determine the important properties of air such as are usually obtained from a psychrometric chart.

DESCRIPTION: Two scales on the slide rule combine the relationship between dry bulb and wet bulb temperatures to obtain the relative humidity reading, shown in the small

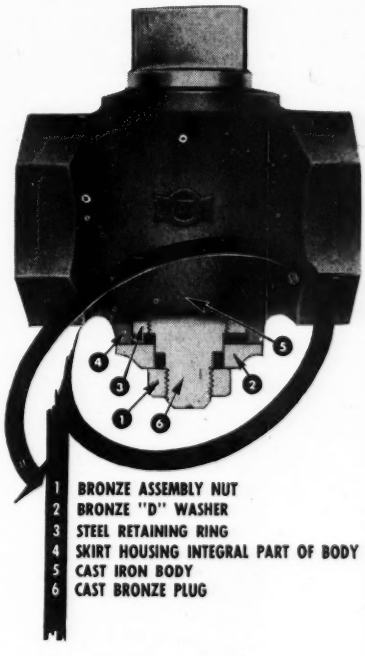


window of the slide. Two other scales combine the relationship between dry bulb and dew point temperatures to obtain the relative humidity reading in another window. By using one of these sets of scales, the three temperature values may be determined when only two are known, or when one is known together with relative humidity.

HAYS®

TAMPER-PROOF GAS STOPS

FEATURES


1 BRONZE ASSEMBLY NUT
2 BRONZE "D" WASHER
3 STEEL RETAINING RING
4 SKIRT HOUSING INTEGRAL PART OF BODY
5 CAST IRON BODY
6 CAST BRONZE PLUG

- Tamper-Proof Design with Non-Removable Plug.
- Extra Grade Gray Iron Body, Gas Service Bronze Plug.
- Steel Retaining Ring Prevents Removal of Plug.
- Steel Retaining Ring Assembled to Bottom of Plug—Eliminates Possible Damage to Precision Ground Surface of Plug and Body.
- Steel Retaining Ring Threaded and Staked to the Largest Metal Diameter on Bottom of Tapered Plug—Assures Retention without Distortion.
- Steel Retaining Ring Anchored without Drill Hole or Pin—Eliminates Possible Shearing of Plug.
- Steel Retaining Ring Located below Shoulder of Body—Permits Freedom for Service Adjustment of Plug.
- Steel Retaining Ring Recessed and Inaccessible within Iron Body—Gripless and Shearless.
- Plug and Body Precision Ground and Matched for Perfect Seating.
- Individually Tested Under Rigidly Controlled Inspection.
- Lubricated with a Compound of Greases Suitable for Use with Manufactured, Natural or Liquid Petroleum Gases.
- Obtainable in a Variety of Patterns.

Write for Folder 120-C D

AVAILABLE IN

Black or Galvanized

Flat Head Less Check
Flat Head With Check
Flat Head With Lock-Wing

Sizes; ¾"—1"—1¼"—1½"—2"

Also HAYS STANDARD
HEAVY PATTERN IRON BODY GAS STOP

For 75 Years the Gas Industry has relied on HAYS Iron Body Gas Stops

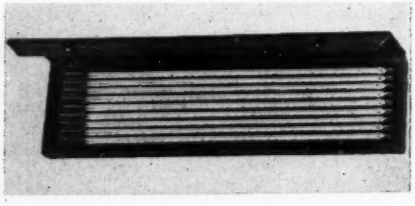
With these values known, all other properties of air can be determined by referring to the windows on the back of the calculator. A table of conversion factors is also included.

Thermometer Set

TAGLIABUE INSTRUMENTS DIVISION, Weston Electrical Instruments Corp., 614 Frelinghuysen Ave., Newark, N.J.

MODEL: Tag-ASTM certified thermometer testing set.

APPLICATION: To provide inexpensive,



accurate temperature measuring instruments for engineers, scientists, and technicians in research and standardizing laboratories.

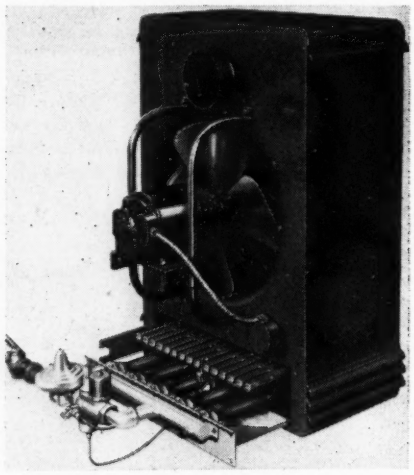
DESCRIPTION: Nine matched thermometers with overlapping ranges are available either in Centigrade (—38 to +405°) or Fahrenheit (—36 to +760°). Each thermometer is furnished with a test room certificate of accuracy, listing compensations for individual scale characteristics. Certificates are obtained by calibration against National Bureau of Standards certified thermometers.

Unit Heater

THE TRANE CO., La Crosse, Wis.

MODEL: Trane gas-fired heater.

DESCRIPTION: Heat generator includes burner heads and mixing tubes of one-piece cast iron construction, eliminating the customary joint between the two parts. Burners,



pilot, and control valves are combined in one drawer-type assembly. There are no gaskets, and joints are leakproof. The fan may be controlled by a room thermostat. The Torrid Tube heat exchanger is the heart of the unit and allows large quantities of air to pass through with minimum friction. Trane heaters are produced in seven sizes with capacities from 50,000 to 210,000 Btu/hr input and 700 to 2700 cfm.

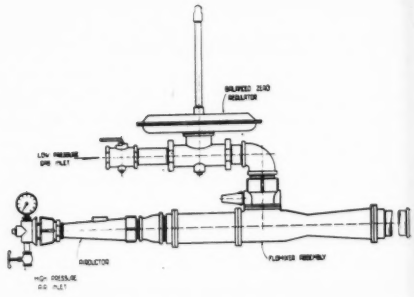
Low-Pressure Air Producer

BRYANT HEATER DIVISION, 17825 St. Clair Ave., Cleveland 10, Ohio.

MODEL: Air-Ductor.

APPLICATION: Recommended for use where low-pressure air use is infrequent and purchase of a blower would not be justified.

DESCRIPTION: The Air-Ductor is a device for producing large volumes of low-pressure air (up to 1 lb) using high-pressure compressed air as a power source. There are many applications, the manufacturer states, where a supply of compressed air at 30 to 150-lb pressure is available to induce atmospheric air and produce a greatly increased quantity of low-pressure air. High-pressure air consumption will average 25 to 35% of the volume of 16-oz pressure air produced and will decrease with lower delivery pressures



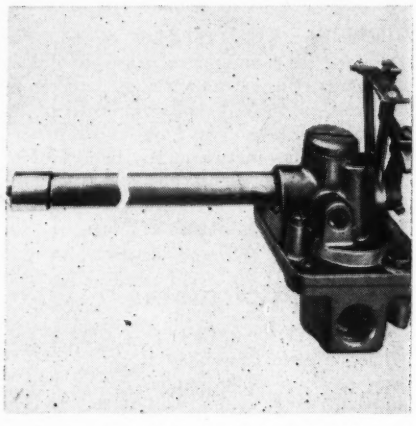
and higher compressed air pressures. Air-Ductors are supplied with outlet connection sized correctly to minimize pressure losses. The assembly includes high-pressure needle valves and pressure gauges.

Furnace Control

WARD HEATER CO., 1800 W. Washington Blvd., Los Angeles 7, Calif.

MODEL: Bilt-In Thermo control.

DESCRIPTION: This new control is a

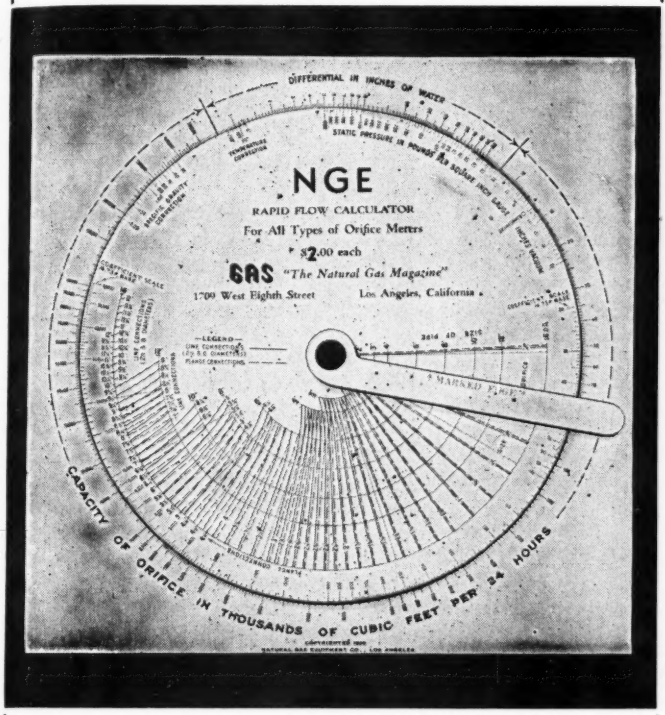


package unit, self-contained and self-operated, and requires no outside energy. It will operate furnaces on either by-pass or "on and off." A simple adjustment of the by-pass screw provides the type of operation desired. The top portion of the control may be removed for servicing.

NGE RAPID FLOW

CALCULATOR

FROM 2 inches TO 16 inches


NGE
RAPID FLOW CALCULATOR
For All Types of Orifice Meters
$2.00 each
GAS "The Natural Gas Magazine"
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CAPACITY OF ORIFICE IN THOUSANDS OF CUBIC FEET PER 24 HOURS

. . . will quickly compute any of a series of variables in the transmission of natural gases.

SIMPLE to operate: Set dial . . . Turn indicator . . . *and instantly find*

1 COEFFICIENT and VOLUME
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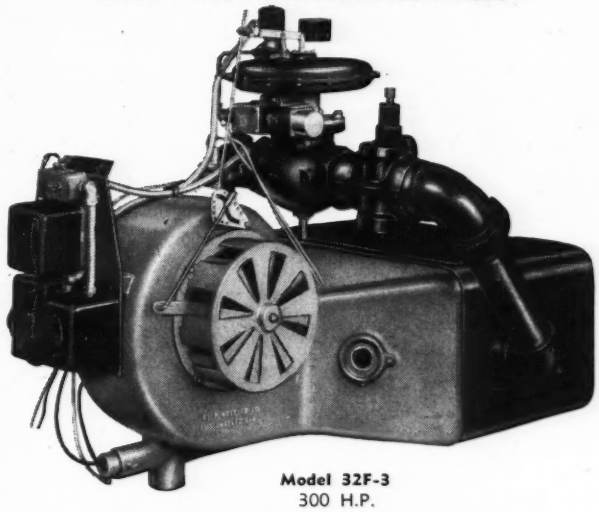
The Mettler "FAN-AIR" Gas Burner

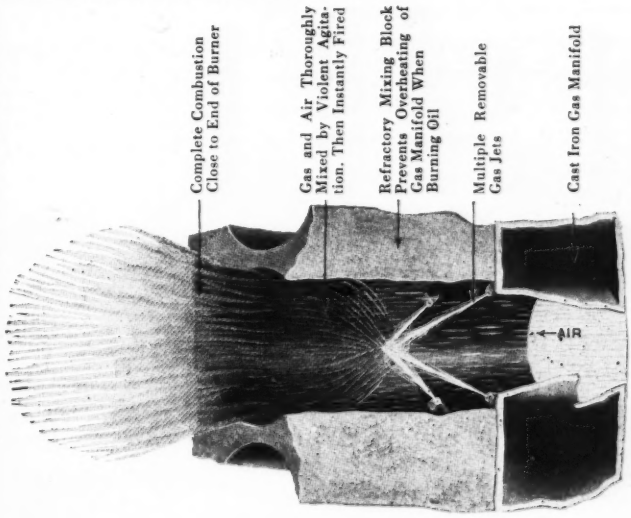
LATEST MODEL FEATURES NEW AUTOMATIC SAFETY PILOT and TRIPLE CONTROLS



Model 32F-3
300 H.P.

FOR YOUR PROTECTION AND SAFETY

Picture reveals some of the essential and desirable POINTS of FAN-AIR MECHANICAL DRAFT GAS BURNERS. Not just a burner but a COMPLETE and FULLY AUTOMATIC GAS BURNER SYSTEM, factory tested and ready for application when received. Furnished complete as pictured with simple, dependable automatic on and off or modulating controls. Burner and Controls WITH SPARK IGNITION and FLAME SAFEGUARDS are scientifically coordinated to provide INSTANT FUEL SHUT-OFF on FLAME FAILURE—MEETING APPROVAL REQUIREMENTS.


Complete Combustion Close to End of Burner
Gas and Air Thoroughly Mixed by Violent Agitation. Then Instantly Fired
Refractory Mixing Block Prevents Overheating of Gas Manifold When Burning Oil
Multiple Removable Gas Jets
Cast Iron Gas Manifold
AIR

Here's Why

THERE'S A DIFFERENCE IN GAS BURNERS

Above sectional view graphically depicts the EXCLUSIVE and unique design of a METTLER BURNER CASTING. Note how it "Mixes" gas and air. NOTHING ELSE LIKE IT.

FAN-AIR Burners in upper picture embody this famous casting with all the other assembled features. Why be satisfied with less—when all these tangible advantages are so readily available. (11) Sizes—5 to 500 H.P.

THE METTLER CO., INC.

NOTE THIS NEW ADDRESS

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Tight as a Drum!

VULCAN DIAPHRAGMS are *vulcanized* to the rings, with special wire fastening for *extra* security. The seams are vulcanized for a tight seal. Each diaphragm is machine tested for tightness before it leaves the plant.

This means a saving in time and money — in your meter shop and on the consumers' premises. For an aid to accurate metering, specify tight, clean, uniform VULCANS. Save money on original installation and maintenance. Use VULCAN Diaphragms for meters, regulators and governors.

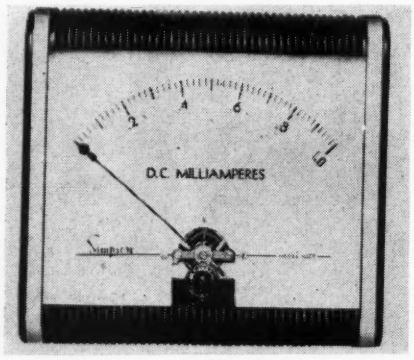
VULCAN
RUBBER PRODUCTS, INC.
(Formerly Vulcan Proofing Co.)
First Avenue and 58th Street
BROOKLYN 20, N. Y.

Panel Instruments

SIMPSON ELECTRIC CO., 5200 W. Kinzie St., Chicago.

MODEL: Nos. 1027, 1029, and 1127 modernistic panel instruments.

DESCRIPTION: These models come in 2½-, 3½, and 4½-in. sizes. The large scale



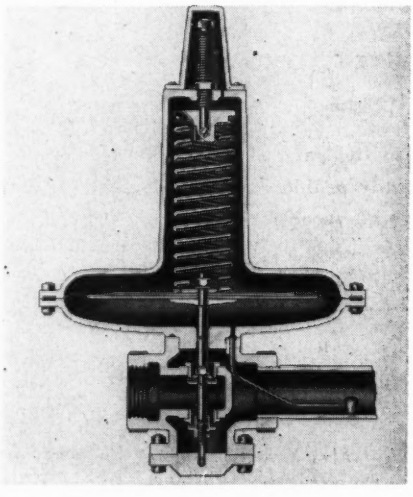
allows easy reading under all light conditions, and the etched face extends across the entire front of the meter and is covered with unbreakable plastic. Vertical chrome-plated strips are recessed into the plastic fluted cover. The special, open scale layout permits use of customer's name, trademark, or other printed information.

Regulator

CHAPLIN-FULTON MANUFACTURING CO., Neville Island, Pittsburgh 25, Pa.

MODEL: 46S pressure regulator with Dynaknob control.

DESCRIPTION: This regulator, designed to provide the best possible pressure control for industrial use of gas, is intended to handle



flow rates from zero to 48,000 cfh with supply pressures up to 50 psi. Outlet pressure settings can be made for all types of combustion burners from atmospheric to pressures of 20 psi. The Dynaknob control line, according to the manufacturer, provides a higher degree of accuracy than was formerly possible.

Gas Dryer

WHIRLPOOL CORP., St. Joseph, Mich

MODEL: 1951 Whirlpool gas dryer.

DESCRIPTION: This dryer was designed as a companion for the Whirlpool washing machine and has the same Flikit automatic pilot which provides instant ignition. A safety door stops the dryer the second the door is opened and restarts it when the door is closed. Other safety features include relocation of the control panel at the top rear,

out of the reach of children, and two automatic valves which operate simultaneously and shut off the main line if flow of gas is interrupted. A lucite door release glows when the dryer is in operation. Cabinet height is 36 in. (39 in. at control panel); width, 29½ in.; and depth, 25½ in.

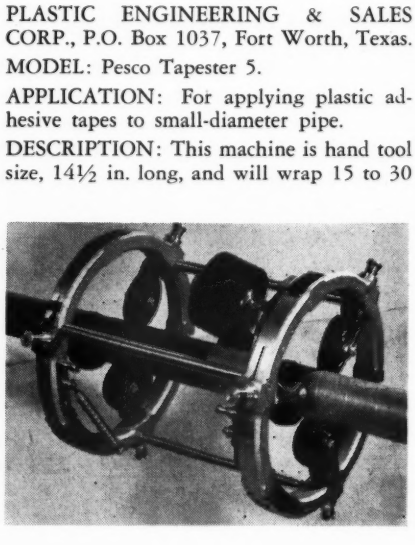
Wrapping Machine

PLASTIC ENGINEERING & SALES CORP., P.O. Box 1037, Fort Worth, Texas.

MODEL: Pesco Tapester 5.

APPLICATION: For applying plastic adhesive tapes to small-diameter pipe.

DESCRIPTION: This machine is hand tool size, 14½ in. long, and will wrap 15 to 30



ft of ¾-in. or 2-in. pipe per minute. Two-inch tape is used, although 4-in. may be used on 2-in. and 1½-in. pipe if a special head is used. The machine may be set for any five pipe sizes in less than five minutes, the manufacturer states. It will ride up and down over cut backs in thick coating on pipe or over welds and couplings when wrapping field joints. Machines may be rented or purchased.

TRADE LITERATURE

PREFERRED UTILITIES MANUFACTURING CORP., 1860 Broadway, New York City—A new 160-page catalog details standard top-quality equipment used for automatic heat and power installations. The book's three major sections are devoted to (1) packaged steam generators, oil and gas burners, ranges, water heaters, bake ovens, and heavy equipment; (2) oil and gas accessories and oil line accessories and controls; and (3) data for designers and installers of oil and gas-fired heating, hot water, and power plants. Price: $2.50.

SURFACE COMBUSTION CORP., Toledo 1—Bulletin SC-145 presents the latest developments in the modern dry (gas) cyaniding process. The bulletin is intended to bring metallurgists and heat treaters up to date on improvements since the process was announced in 1945. Liquid quenching and slow cooling and their applications are described, and modern equipment and typical installations using both continuous and batch-type equipment for large scale and limited production are presented.

THE PARTLOW CORP., New Hartford, N.Y.—"The Design and Process Engineers Guide to Industrial Temperature Measurement and Control" is the title of bulletin No. 101, a 24-page manual for process engineers, plant managers, design engineers, and heating engineers. The study defines the different types of control systems and distinguishes between them so the engineer can select the appropriate type.

U. S. STEEL CORP. OF DELAWARE, 436 Seventh Ave., Pittsburgh 30—How to plan and conduct an effective sales training meeting is the subject of an 84-page book published recently. Numerous cartoons brighten the pages, and an inclusive index increases the book's value. A limited number of copies are available from the sales personnel division without cost.

MULLINS MANUFACTURING CORP., Warren, Ohio — "Kitchen Planning on a Small Budget" is a 20-page booklet recently revised to include photos and reference to the Youngstown Kitchens "jet-tower" dishwasher and other new equipment. Originally designed as a kitchen planning textbook for teachers and home economists, the booklet is also used by retail dealers.

ATLANTIC METAL HOSE CO. INC., 123 W. 64th St., New York City—Catalog 500 contains the latest data on flexible metal hose compiled by the company's engineers. Included are the U.S. Navy Dept. test table for bronze and steel hose, data on bending diameters, hydrostatic bursting pressures, and series of installation diagrams.

E. F. GRIFFITHS CO., Phiadelphia 44—A new looseleaf catalog shows the company's complete line of conversion parts, components, special appliances, and tools. The catalog features a wide selection of orifices, plugs, adapters, and jets.

Standard Equipment—
MAXITROL!
The finest equipment demands the finest parts — Maxitrol Gas Regulators, featuring the "straight-thru" flow of gas principle, are becoming a standard in the industry!
More manufacturers are switching to Maxitrol than all others combined. The Reason: Maxitrol Gas Regulators offer greater capacity, plus superior performance, in smaller sizes thus lowering manufacturing costs and providing uniform quality with perfect operation under ALL conditions!
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NAME_____ POSITION_____

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PEOPLE

W. G. Adair
... Empire

J. W. Smith
... Sprague

A. E. Weingard
... Amer. Meter

H. L. Ley
... Ky.-W.Va.

Promotion of WILLIAM G. ADAIR from district manager of Empire Stove Co.'s Little Rock, Ark., district to branch manager of the northern Indiana, northern Illinois, and southern Wisconsin territory has been announced. Mr. Adair will headquarter in Fort Wayne, Ind.

JAMES W. SMITH has succeeded the late HAROLD KAHLER as southwestern sales engineer for Sprague Meter Co., Bridgeport, Conn. For the past 10 years Mr. Smith served as meter superintendent for Peoples Natural Gas Co. in Omaha. He has been active on committees of the Mid-West Gas School and is the author of several prize-winning papers on gas measurement.

American Meter Co., New York, has announced the appointment of ARCHIE E. WEINGARD as manager of production, headquartering at the Erie, Pa., plant. Mr. Weingard joined American Meter in 1947 as supervisor of methods and later became assistant to the vice president. He was associated with General Electric for 16 years and with Lord Manufacturing Co. for four years.

Kentucky West Virginia Gas Co. has elected HERBERT L. LEY vice president in charge of operations. Mr. Ley will headquarter in Prestonsburg, Ky., and will report directly to D. B. BEECHER, vice president and general manager in Ashland, Ky. Since joining Kentucky West Virginia in 1928, he has served as land agent, general superintendent, and manager of construction and operation.

On Oct. 1 WALTER J. HERRMAN, former vice president of Commonwealth Services Inc., New York, took over as vice president of Southern California Gas Co., Los Angeles. Mr. Herrman, who testified in SoCal and SoCounties rate cases, will handle all rate and appraisal matters for the company. He has spent 25 years in the public utility and financial fields.

W. J. Herrmann
... SoCal

H. R. E. Austin
... Norwalk

Appointment of H. R. E. AUSTIN as sales manager has been announced by Norwalk Valve Co., South Norwalk, Conn. Mr. Austin has an extensive sales management and engineering background, most recently serving as president of Austin Mason Co., New York engineering manufacturing concern.

J. J. CURVIN has succeeded the late ROY A. REEDER as purchasing agent for United Gas Corp., Shreveport. Mr. Curvin joined the organization in 1936. Another purchasing department employee, B. L. PRINCE, was named supervisor of stores.

SULFUR-FREE GAS

AT LOWEST COST

WITH IRON SPONGE

Iron Sponge is a concentrated purification material that operates with high efficiency at high or low pressures, has excellent capacity and activity, gives long service between foulings and is simply and quickly regenerated. This is why Iron Sponge has been preferred for H_2S removal for over 75 years.

CONNELLY, Inc.

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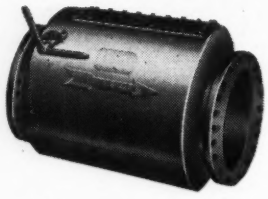
Elizabeth, N. J. • Los Angeles, Calif.



NORWALK
DISC TYPE
CHECK VALVE

Flanged and
Fabricated in Steel

For *GAS* and *AIR*—
LOW and *HIGH PRESSURES*

Can be supplied for use with any pressures. Easily lubricated through grease fitting. Indicator shows position of disc. Can be counter balanced for vertical jobs. Dash pot can be installed to prevent chattering when passing high velocity gas or air.

NORWALK VALVE CO.
South Norwalk, Conn.

THE FAST AND EASY WAY!

STAUFFER PIPE REPAIR CLAMPS

to Permanent PIPE REPAIR

STAUFFER MFG. CO. **El Monte, Calif.**

D. W. Reeves

Oklahoma Natural Gas Co., Oklahoma City, has announced the resignation of D. W. REEVES, general sales manager. Mr. Reeves accepted a position as executive vice president with the Public Service Co. of New Mexico, Albuquerque. In 1938, he joined Oklahoma Natural as industrial sales manager and, except for a military leave, he remained in that position until becoming general sales manager in 1946. Currently, he is serving as president of the Oklahoma Utilities Assn. and chairman of the AGA industrial and commercial gas section.

H. EMERSON THOMAS, president of the Martinsburg (W. Va.) Gas & Heating Co. and the Rockhill (S.C.) Gas Co., recently announced management changes in both companies. THOMAS A. HOLDEN has replaced G. FRANK STINNETT as manager at Martinsburg. D. H. HYATT resigned as manager of the Rockhill company, and LEWIS JENKS has been appointed acting manager.

On Oct. 1 SCOTT B. RITCHIE became vice president in charge of operations for U.S. Pipe & Foundry Co., Burlington, N.J., succeeding RICHARD K. HAUGHTON, who is now production consultant to the president. For the past 30 years Mr. Ritchie has been engaged in engineering, manufacturing, maintenance, and organizational activities. Mr. Haughton has held a number of positions with the firm since 1909.

At a recent board of directors meeting of Central Vermont Public Service Corp., Rutland, President ALBERT A. CREE, who suffered a heart attack earlier this year, was welcomed back and HAROLD L. DURGIN, vice president and chief engineer, was elected executive vice president. Mr. Durgin had been in charge of company affairs during Mr. Cree's absence.

Appointment of CHESTER R. AUSTIN as manager of the development section of the research department of Koppers Co. Inc., Pittsburgh, was announced recently. Mr. Austin joined Koppers as a ceramic engineering specialist in 1948 after doing ceramic research for a number of years at Ohio State university and Battelle Memorial institute.

General Electric's Co.'s air conditioning department has selected managers for its four sales regions. They are H. N. MCMENIMEN, eastern region, New York City; central region, S. C. BERNHARDT, Chicago; southern region, E. J. GUILLORY, New Orleans; and western region, L. M. LARKIN, San Francisco.

JOHN CLAYTON WORSTER has been appointed secretary of The Welsbach Corp., Philadelphia. Recently he has represented the company in Veracruz, Mexico, where he supervised accounting activities of a construction project.

Peerless
GAS CIRCULATORS

Forced air and gravity, Gas Circulators — Unit Heaters — Panel Heaters — Wall Heaters — Radiant Heaters.

Radiant and plain front fully vented models.
20,000 to 60,000 B.T.U. sizes.
Manual or Automatic Controls.
NEW Silver-Tan finish.
NEW Seam Welded gas tight heating sections.
A. G. A. Approved.
Write NOW for complete NEW literature on the line that sells.

PEERLESS MANUFACTURING CORP, LOUISVILLE 10, KY.

Detectron 505
PIPE DETECTORS

FIRST WITH A METALCASE
FIRST WITH SHIELDED LOOPS
FIRST WITH "SURE GRIP" HANDLE
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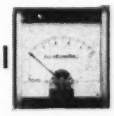

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A new slate of officers has been elected for Michigan Gas & Electric Co. which has moved its headquarters from Ashland, Wis., to Three Rivers, Mich. RICHARD L. ROSENTHAL, Greenwich, Conn., was named chairman of the board. Others are J. P. SHERWOOD, secretary-treasurer; S. F. MASSE, re-elected vice president and named general manager; and H. D. BILLINGTON, assistant secretary-treasurer. Former officers, all Ashland men, resigned.

Newly elected vice presidents of York-Shipley Inc., York, Pa., are CHARLES A. NEIMAN, chief engineer, and JOHN KEARNS, general works manager. They will be in charge of engineering and production, respectively. DEAN D. BARBOR, former secretary and assistant treasurer, has been named secretary-treasurer and E. A. SCHAEFER has been elected assistant secretary.

D. Dailey

DONALD DAILEY, industrial designer of refrigerators, ranges, and other equipment, and holder of 25 design patents, recently was appointed to the executive position of product manager of Servel Inc., Evansville, Ind. For the past 4½ years, Mr. Dailey has operated his own firm of industrial design consultants in Philadelphia. One of the patents he holds is for the first enclosed horizontal evaporator in a household refrigerator, now standard equipment in almost all lines.

CHARLES H. WILEY, field superintendent of the distribution department, Laclede Gas Co., St. Louis, retired Aug. 31 after nearly half a century with the company. He served in a number of supervisory positions and was in charge of the 1932 conversion from 600 to 800-Btu gas. Mr. Wiley was very interested in safety and delivered talks on the subject to a number of civic groups.

Recently announced personnel changes at Lone Star Gas Co., Dallas, include the appointment of S.A. MITCHELL as manager of the Terrell district and ANDREW CARTER HALEY as manager at Seymour. CHESTER R. ROGERS has been named assistant superintendent of gasoline plants, and ROBERT L. STEPHENSON is the new general division dealer sales assistance supervisor.

Appointment of HENRY L. O'BRIEN as general counsel of Cities Service Co. and its subsidiaries has been announced. In recent years he has supervised the disposition of electric utility properties of Cities Service and has assisted in simplification of the company's corporate and financial structure.

"In recognition of his services to the company, the state, and the industry" JUSTIN R. WHITING, president of Consumers Power Co., Jackson, Mich., was honored recently when the firm's new electric generating plant now under construction on Lake Erie was given his name.

Ohio Gas Co., Bryan, Ohio, has announced the following recent changes: JAMES L. TUTTLE, superintendent of distribution has succeeded J. T. KELLEY as general superintendent. Mr. Kelley recently joined Washington Gas & Electric Co., Tacoma. ALBERT H. HARTLEY JR., a company engineer since May 1949, has been named assistant to manager, and JAMES R. JAYNE has been employed as a student engineer.

New cashier of The Peoples Natural Gas Co., Pittsburgh, is EDWARD J. SCHULTZ. Mr. Schultz, employed in the company's treasury department since 1929, succeeded John C. McCutchen, who retired Sept. 1.

Several personnel changes in the gas distribution department, Pittsburgh Group, Columbia Gas System, have been announced. ARTHUR A. GALL was promoted from district foreman to local manager of Manufacturers Light & Heat Co. offices in Uniontown and Somerset, Pa. KENNETH E. HARSH moved from district office manager at the Salem, Ohio, office of Natural Gas Co. of West Virginia to local manager in Salem, Leetonia, and Lisbon; HAROLD W. LOWMAN, chief clerk at Alliance, Ohio, succeeded Mr. Harsh. New district engineers stationed in Pittsburgh for Manufacturers are ALBERT E. MARX, and JOHN D. FORD. MARGARET EASLEY, of the Pittsburgh Group home service staff, has been named home economist in charge of food preparation demonstrations for cooking schools.

Obituaries

E. L. Hall

E. L. HALL, who retired a year ago as vice president of Portland (Ore.) Gas & Coke Co., died Sept. 1 after a brief illness. Mr. Hall joined the Portland utility in 1906 and served successively as chemist, assistant superintendent, general superintendent in charge of production and distribution, and vice president and chief engineer. He assisted in designing the company's oil-gas plant and played a leading role in the development of its by-products business.

On Sept. 10 NORMAN B. WOOD, 60, sales service manager of Hamilton Manufacturing Co.'s appliance division at Two Rivers, Wis., died of a heart attack. Colonel Wood concluded a long army career in 1949 when he was retired after 34 years of continuous service. He had been with Hamilton for the past 14 years.

Laclede Gas Co.'s (St. Louis) assistant sales manager, DANIEL J. FAGIN, died on Aug. 24. Mr. Fagin joined Laclede in 1933 as a heating engineer and was named assistant sales manager in 1941.

Chief auditor for The Gas Service Co., Kansas City, THOMAS BOYD JAUDON, died last month at Branson, Mo. He was 48 years old.

For better public relations, efficiency, economy

PG&E's Storage Goes Underground

By JOHN WESLEY NOBLE

Exclusive

NEXT January, should northern California temperatures drop to lows equaling the coldest winter of record—say the one of 1932—Pacific Gas & Electric Co. will encounter a peak load of 1104 MMcf of non-curtailable gas. With wildly expanding cities, suddenly booming war plants, and greater demand than ever before in the history of West Coast gas supply, that means a tremendous storage problem. It means reservoirs of gas concentrated at load centers as never before.

On the PG&E system as a whole, 70% of the daily sendout of gas comes in the 14-hr period from 7 a.m to 9 p.m., when people are up and about their homes and places of business. The 70% generality maintains itself in individual communities, and the transmission network will carry only 58% of the requirements. Line pack and storage holders must take care of the remainder.

Furthermore, in the touchy public relations of modern utility experience, the old type, low-pressure, above-ground holder is an unpopular landmark. PG&E discovered that factor when it sought to locate its 384-ft Point Richmond holder, one of the largest in the world. Originally planned for a site at Albany, on the northeast shore of San Francisco bay, the 17-MMcf holder was rousted by public protest until finally it had to be hidden behind a hill more than two miles from its transmission line. For this and various other reasons, including economy and efficiency of operation, PG&E is taking its storage underground.

Company engineers immediately modified the high-pressure bottle system of underground storage and designed plants using the selfsame 34-in. steel pipe that is carrying gas 1600 miles through the Super Inch line from fields in Texas and New Mexico. This is simple mill-manufacturer standard pipe, and three such storage holders already have been built. One is at San Rafael, on the north shore of the bay; a second at Fresno, in the lower Central valley, and the third at Yuba City, near the foothills of the northern Sierra Nevada. Two more, at Modesto, in the San Joaquin valley, and North Sacramento, will be completed in time for the winter peaks. In all cases, PG&E has acquired more land than it needs for immediate use, anticipating continued growth in demand.

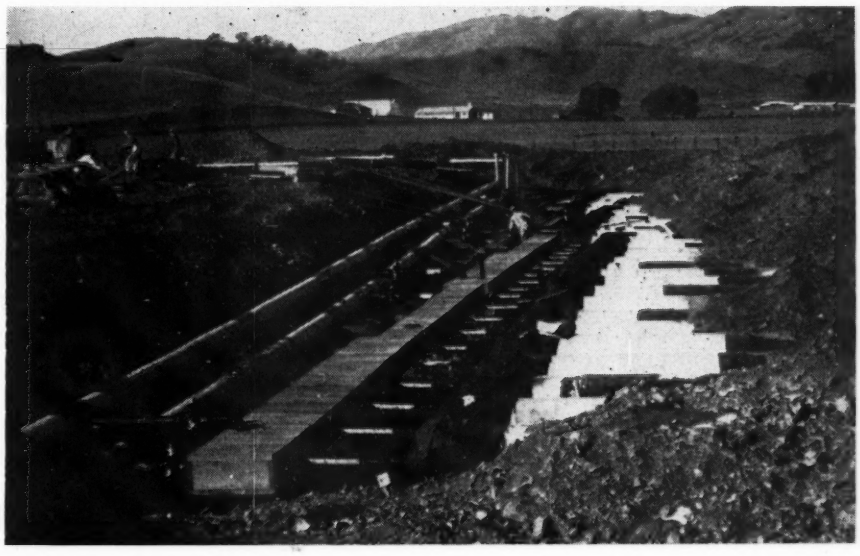


Fig. 1. Installing redwood boxes on 4-in. header and general piping detail at San Rafael holder yard.

The North Sacramento storage plant will reflect lessons learned by the company last year in building the first three underground holders. It will consist of 38,000 ft of 34-in. high-pressure steel pipe laid underground in banks, or parallel rows, 1200 ft long with manifold connections, and will store 6 MMcf. There will be 6½ banks of five pipe sections each. A compressor at the site will pack gas into the holder during off-peak periods at pressures up to 550 psig. Three thousand feet of 12-in. high-pressure line will be laid to connect the holder with the Sacramento area gas distribution system and cost is estimated at $1,297,000.

So how does this underground system cost in comparison with the old style above-ground holder? PG&E cites these figures: the estimated cost of the San Refael underground storage plant was $1,605,400 for 7 MMcf of storage, or $230,000 per million feet. The gigantic Point Richmond low pressure tank cost $4,916,525, or $290,000 per million feet. The cost for installation of the underground, then, was $60,000 less per million feet of gas stored than the tank holder. In addition, it cost $200,000 to paint the Point Richmond holder and protect it against weathering. Actually, though, company engineers assert the difference in cost still is not the primary feature of underground storage, important though it is.

War on the Pacific Coast is far from improbable. Earthquakes are a definite possibility in California. Airplane traffic has increased, both privately and with the military, both of which menace above-ground holders and steady flow of gas when it might be needed most.

PG&E engineers believe a 500-lb bomb dropped directly on one of its new underground holders would cause no great damage. Actually, they point out, enemy fliers would have difficulty locating the holders as potential targets for, once covered by the standard 2 ft or more of fill, they resemble nothing but the surrounding fields. The Fresno superintendent, as a matter of fact, grew a crop of barley over his underground holder, realizing a profit at the same time he held down the dust. Obviously

John Wesley Noble, who makes his first appearance in GAS this month, is a free-lance feature writer with a solid background of technical and industrial writing experience. Working out of San Francisco, he has contributed to both technical and general circulation magazines. Early last summer, he shared a Collier's byline with Dean Jennings (then the magazine's West Coast editor) for authorship of "PG&E IS the People."

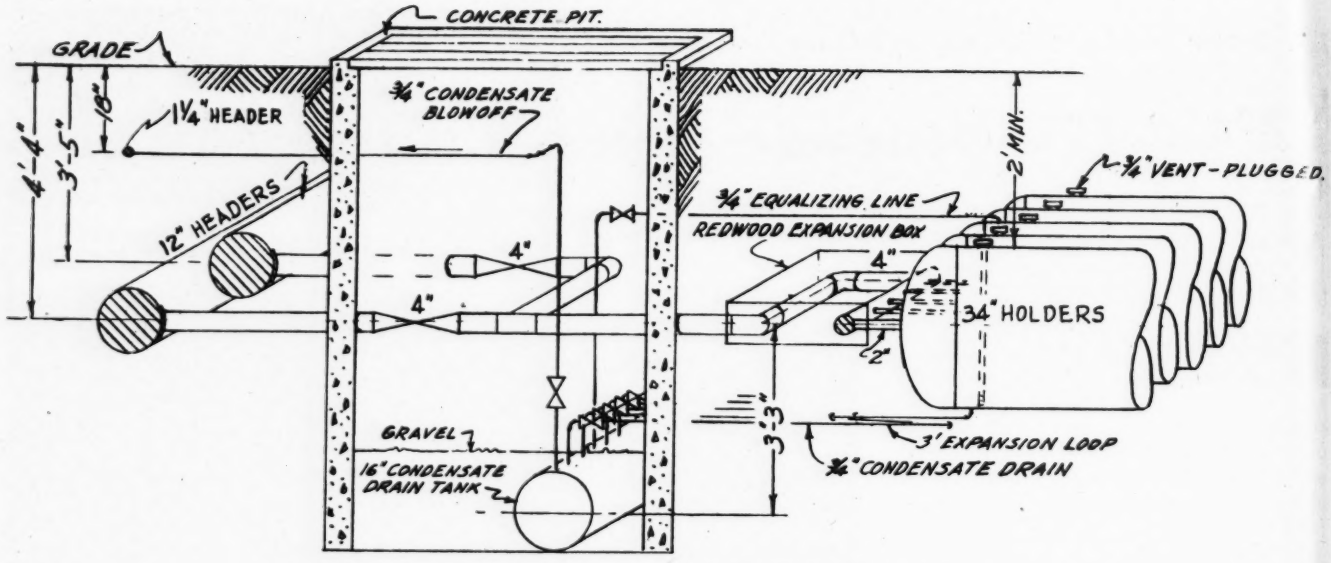


Fig. 2. Typical holders in PG&E system, showing valving, header connections.

no errant airplane will be crashing against the holders, the public's unwarranted fear of gas storage facilities is allayed, if not prevented entirely, and the space additionally may be used as a parking lot or for storing equipment. Naturally no permanent buildings may be erected over the banks of pipe.

Now that PG&E has found an answer to its storage problem, the San Rafael plant probably will be typical of the other such holders the company is planning. It is located next to the city's Springdale subdivision, as yet undeveloped at the edge of town, and has its condensate tanks lying 25 ft from the nearest property line. The single brick building required houses the compressor station and is the only above-surface structure. It is hidden behind attractive landscaping. Because this is to be an automatic operation, complicated controls have been installed to handle it remotely from the San Rafael gas plant, several miles away.

The entire storage plant occupies a site of 600 x 1200 ft, with an equal amount of land purchased and set aside for future expansion. The plant is made up of 62 pipe containers arranged in six banks, varying from 6 to 13 pipes per bank because the site is jogged at one corner. Each bank gives a minimum of 1 MMcf of storage, and a total of 37,392 ft in parallel sections underground.

The ends of the pipes are closed by semi-elliptical leads. At the front end of each is attached a 2-in. nozzle to the head of the holder. This nozzle is manifolded into a 4-in. connecting pipe, as shown in *Figs. 1 and 2*. This 4-in. pipe is connected to a double header system with a bend made of pipe and fittings. The bend is made to allow for any contraction or expansion of the pipe, which might occur before the earth is packed sufficiently around the tubes, and is enclosed in a redwood box.

The double header system is used to permit more flexibility in the holder's use—that is, storage of gas at differing pressures, or to store natural and manufactured gases, or to allow a blow down without shutting down the holder. The tubes are double-wrapped with a PG&E standard wrap for underground service. They are laid in at uniform grade to allow the condensate to drain toward the head end. This drainage is accomplished by means of ¾-in. extra heavy seamless tubing attached one to each pipe or tube, an equalizing line for each bank of pipes. This setup allows the condensate to flow by gravity into the condensate tank located at the end of each bank of tubes. These tanks are further piped together to allow for easy collection of condensate at a convenient location.

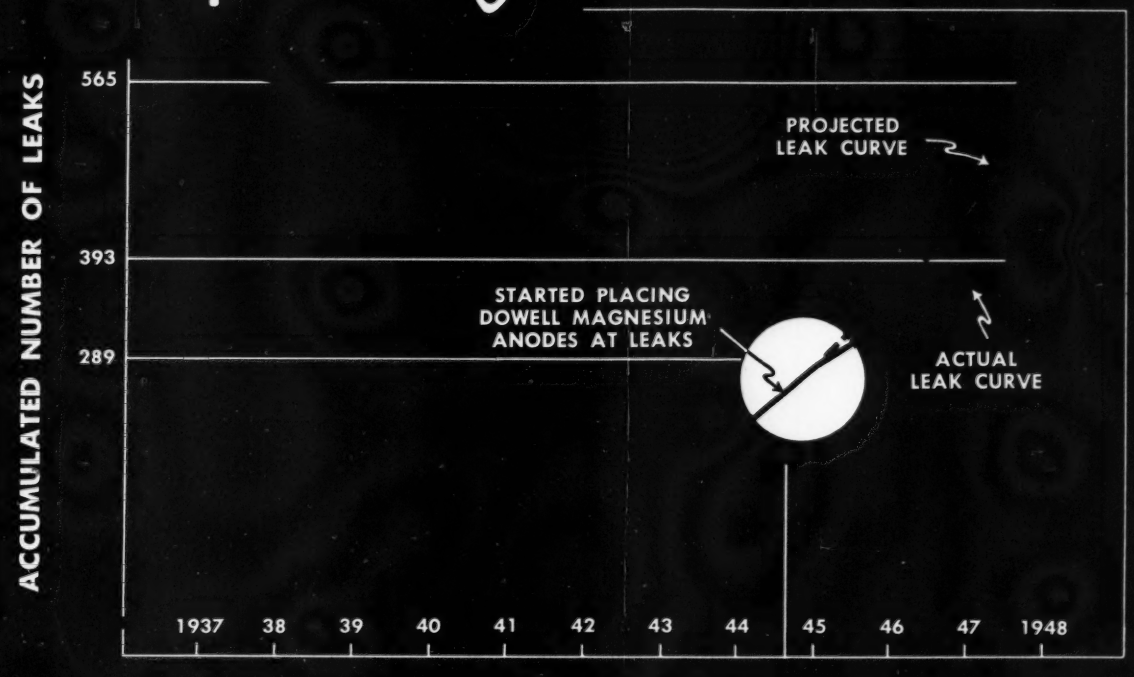
An immediate advantage of the system is apparent in the flexibility of operations worked out at San Rafael. The banks are so valved that one section may be repaired while the others are working. Any one bank may be isolated, or different gravity gases can be stored in various sections of the same storage holder.

Additionally, the automatic feature permits complete operation of the plant without a workman on the premises. Compare this with the shift engineer required at above-ground holders, plus the man to take readings, and you can figure a definite saving in labor costs during operation.

There is also an advantage in allocation of power. The compressor—which at San Rafael is a single unit, electric motor-driven, 2500-hp two-stage compressor—takes gas off the main line and compresses it into the holders when the

Fig. 3. Backfilling to cover pipe as it is installed.

hot spot economy!



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Such cathodic protection is economical as well as effective. This company installed anodes at each leak point when leaks were repaired. *The total cost of the anode installation was more than off-set by the maintenance savings* resulting from the reduction in the rate of new leaks.

Sizeable reductions in the number of new corrosion leaks are common when Dowell magnesium anodes are installed. The protection obtained in a particular soil is governed by the number of anodes used.

Dowell magnesium anodes require no external power or maintenance. In addition to oil and gas pipelines, they have proved valuable in controlling corrosion of municipal gas and water lines, storage tank bottoms, and many other underground and underwater installations. Write to Tulsa, Dept. 17, for free booklet and more information.

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MAGNESIUM ANODES FOR CORROSION CONTROL

load is slack. This is done at night, when there is no burden on the company's electric department to provide the power. Company men admit this compressor station is a little more costly at the underground type station than at the tank holder, but PG&E cost accountants still find in favor of the underground operation.

The San Rafael station, just north of the city near Redwood highway, lies conveniently near a principal high-pressure main, and there is no necessity of bringing the big mains closer to town. Also, while the California Public Utilities Commission has not yet set specific safety standards for underground storage units of this type, PG&E built to conservative engineering standards, with a 2½ safety factor on pipe, 4 on the valves, and maximum 670-lb tests on all underground design.

The company has "felt its way" on the first three underground plants, but figures it will save and profit on the new ones to be constructed. In the future, the pipe is likely to be less expensive, and at North Sacramento they probably will work with bigger pipe and lower pressure. Underground storage always requires sufficient land—more than for above-ground installations—but so far most areas in the west are not saturated in this respect. One lesson learned at San Rafael was how to excavate for pipe banks. Formerly ditches were dug for the individual pipes, and PG&E fought constant cave-ins. So at San Rafael they simply gouged out the whole underground area with bulldozers and then backfilled to cover the pipe as it was installed. (See *Fig. 3.*)

The final 150 miles of the 506-mile Super Inch, in its stretch from Topock, near the California-Arizona border, to Milpitas, nerve center of PG&E's gas distribution, is designed to carry more gas than normally is needed. Here, the company can employ line pack storage for load equation. But in the PG&E system 1° drop in temperature increases the sendout of gas over the entire system by 23 MMcf. Communities such as Monterey, on the coast, have year-round heating requirements. Sudden drops in temperature are as likely in summer as in winter. When the sun goes behind a cloud, when fog rolls into San Francisco, or when a wind blows from seaward there is an immediate rush to the furnace in every home. If the temperature should drop 5° in the PG&E territory, which is not at all uncommon, there is an increased demand over the system of 125 MMcf, adding to the storage problem.

So PG&E, while it may continue to build above-ground holders and will use line pack storage where it can, is forced to go underground with its major problem.

APPLICATION of the penetrant to the inspection of metal parts subjected to high stresses is demonstrated with this connecting rod, which appeared sound when visually inspected, but showed tell-tale bleed lines when dye was used.

Dye Penetrant Finds Surface Flaws Non-Destructively

—By BILL CLARK

A QUICK, easy, and relatively inexpensive method of locating surface cracks and flaws in metal surfaces that has been recently developed may prove a useful tool of many applications for the gas industry.

Exclusive

The needs for non-destructive testing methods are many and varied in the industry, where integrity of welds, vessels, and machinery is all-important, and a simple, sure implement might well open new avenues for inspection of new parts and preventive maintenance of equipment on the line.

Red Dye

The method utilizes a red dye penetrant, in conjunction with other liquids, to indicate the presence of imperfections too small to be seen with a magnifying glass. When applied to the surface, "Dy-Chek," as the liquids are trade-named, causes a crack or other opening to bleed in telltale scarlet lines, which show brilliantly on a white background.

Dy-Chek can be employed to test any metal surface, ferrous or non-ferrous, so long as it can be "seen and reached." Its application is simple and can be performed by anyone, with little training required. The surface is first cleaned thoroughly — a special cleansing agent is provided, then the red dye is applied, either by dipping, painting, or spraying; after five or 10 minutes the dye is removed with the cleaner, and the white developer solution is applied. As the developer dries to a chalky white, any crack or surface break immediately appears as a thin, red line.

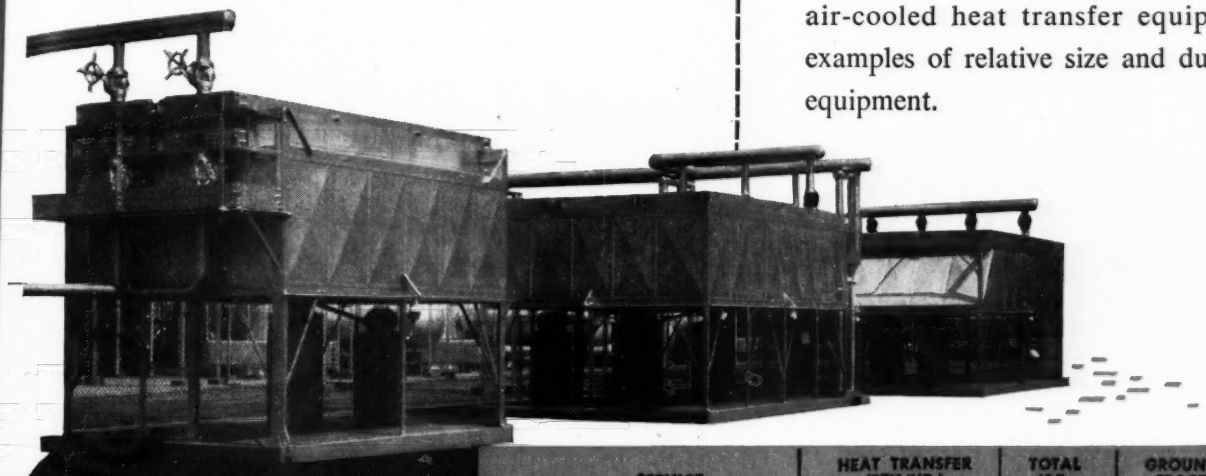
The penetrant is a supersaturated liquid with a non-water-soluble red dye, non-toxic and non-corrosive. Its extremely low surface tension and high capillarity permit it to flow into microscopic crevices. The "developer" acts with a blotter effect, pulling the dye from the crack to the white surface. Although after standing for some time it has a tendency to spread and fade, it gives a faithful reproduction of the flaw for a satisfactory period.

Strong Capillarity

Its strong capillarity can be demonstrated with shapes which have flaws running through to opposite surfaces. For example, it has been applied to the inside surface of a pump housing, after which the white developer was painted on the exterior, and the dye has traveled through the inch-thick metal to expose the flaw on the oppos-

Here are 15 TYPICAL APPLICATIONS for FIN-FAN AIR-COOLED Heat Exchanger Equipment

For many years, Fin-Fan Air-Cooled Heat Exchangers have proved their worth by giving reliable, economical service in many and varied applications. The Fluor Corporation, Ltd., and Griscom-Russell Company, pioneer-partners in the air-cooled heat transfer field, offer the following to show the large variety of practical applications for air-cooled heat transfer equipment and examples of relative size and duty of such equipment.



	SERVICE	HEAT TRANSFER (BTU/HR.)	TOTAL H.P.	GROUND SPACE
GAS COOLING	Natural Gas After-Cooler	13,920,000	80	46′ x 25′
	Manufactured Gas Cooler	11,165,000	50	23′ x 21′
	Natural Gas After-Cooler	3,400,000	15	11′ x 21′
	Natural Gas Inter-Cooler	7,890,000	40	23′ x 21′
VAPOR CONDENSING	Reflux Condenser	18,407,000	90	48′ x 25′
	Primary Condenser	4,652,000	40	11′ x 25′
	Still O.H. Condenser	4,875,000	34	16′ x 21′
	Debutanizer Condenser	11,930,000	60	23′ x 25′
	Still Reflux Condenser	39,110,000	60	46′ x 25′
	Steam Condenser	87,300,000	300	138′ x 31′
	Steam Condenser	2,880,000	10	10′ x 6′
LIQUID COOLING	Vegetable Oil Cooler	628,000	15	6′ x 17′
	Absorption Oil Cooler	14,915,000	100	32′ x 17′
	Quenching Oil Cooler	1,665,000	50	23′ x 25′
	Amine Solution Cooler	19,300,000	175	38′ x 25′
	Stabilized Crude Cooler	125,100,000	700	315′ x 25′
	Jacket Water	2,400,000	5.5	16′ x 12′
	Jacket Water	28,800,000	100	70′ x 24′

A new 8-page bulletin on Fluor-GR Fin-Fan Heat Exchangers is now being prepared. Write in and reserve your copy by post card or letter.

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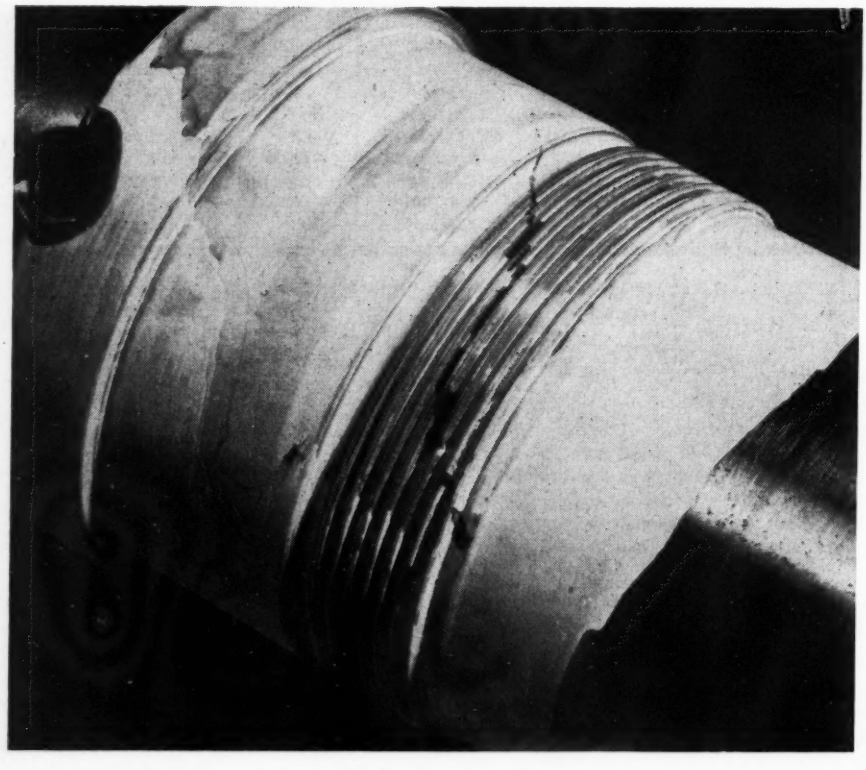
REPRESENTED IN THE STERLING AREAS BY: Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.I., England

ABOVE are shown materials and method of applying the dye penetrant. Tins and jars contain the three liquids required—cleaner, dye, and developer. Technician is shown applying the dye to an aluminum valve casting to seek out surface flaws.

BELOW is a crankshaft undergoing tests for surface flaws. The bleed line discloses a distinct fissure, which shows up in sharp detail against the white background of the developer.



ing side of the housing.

A little experience in "reading" results of such tests will enable the operator to determine the nature and even the probable depth of a discontinuity.

A thin line indicates a crack; a series of dots in a line a very fine, tight crack or bad weld lap; a series of dots of varying pattern, pits or porous points.

Depth Determination

Depth can often be determined by additional bleeding.

The dye gives best results at operating temperatures of 70° to 150° F. Lower temperatures increase surface tension and viscosity.

In preparing the surface for testing, its physical cleanliness must be assured. Rust, scale, and oil—as well as flux and scale in welded work, as these are porous and will absorb the dye—must be removed. Wire brushing is a recommended method and sand-blasting may be used, although it may tend to peen over tiny surface openings if the metal is soft. After the dye has been applied and the dye remover has been used, the surface may be washed with a water spray, then carefully dried before applying the developer.

Turbine Testing

Dy-Chek was developed by Northrop Aircraft Inc., Hawthorne, Calif., maker of the famed "flying wing," for use in testing its gas turbines. Blades had to be checked after each performance for indications of fatigue cracks. By dismounting rotor and stator and running them through a Dy-Chek test, engineers were able to make fast, reliable inspections at the required times. Its use spread to the nearby Byron Jackson plant, where pumps and other oilfield equipment are manufactured. So far limited pretty much to uses in the manufacturing processes and in loading dock checks, the fluid holds promise for extensive field applications.

Might it replace X-ray testing methods on pipeline welds? No, say Northrop engineers, because it won't detect interior flaws which do not appear on the surface; but it may be used to complement present X-ray operating procedures.

As a means of inspecting compressor machinery, whether upon receipt, or in the course of preventive maintenance work, it may be invaluable.

So far, the company isn't quite sure just how broad a marketing field it has. The gas industry, for one, hasn't been tapped, although it is now becoming aware of the potentialities of Dy-Chek. Some leading gas companies are conducting investigations which should uncover some interesting applications.

WALWORTH LUBRICATED PLUG VALVES

offer these advantages

- ... Direct port opening
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- ... Dead tight shut-off
- ... Freedom from attack by fluids being handled
- ... Pressure sealed
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All Walworth Lubricated Plug Valves employ special insoluble lubricants which protect the plug and body against contact with the line fluid, thus combatting erosion and corrosion.

The lapped surfaces of the valve are "pressure sealed" when the valve is in either the open or closed position. By turning the lubricant screw, lubricant is forced under high pressure through a grooving system that completely encircles the ports as well as the top and bottom of the plug.

The lubricant seals the valve against leakage, and reduces friction between plug and body. This permits easy, quick, full-opening, or tight shut-off with only a quarter turn of the plug.

Number 1700 (illustrated) is a Steel-iron valve, wrench operated, designed for a working pressure of 200 pounds WOG (water, oil, or gas). Valves are available in either screwed or flange types. Screwed type have API line pipe thread lengths. Flanged type (No. 1700F) is faced and drilled to American Standard for 125-pound cast iron flanges unless otherwise specified.

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What *IS* Public Convenience and Necessity?

By Samuel H. Crosby

A veteran gas industry legalist studies two recent interpretations, finds that FPC disagrees with itself

Exclusive

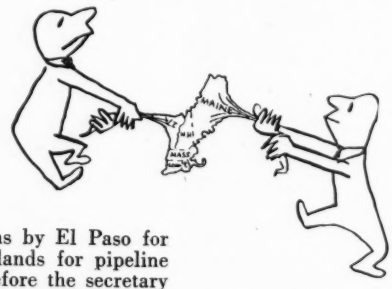
COMPANIES operating interstate natural gas pipelines which must cross government lands are required to agree to become common carriers. El Paso Natural Gas Co. is in that category and the Federal Power Commission recently made rulings of great importance to such companies, to potential producers of gas from public lands, and perhaps to a limited number of consumers.[1] El Paso recently built large transmission lines from Texas to California, unavoidably crossing federal lands, and the right-of-way permits it obtained from the Secretary of the Interior were subject to Sec. 28 of the Leasing Act of 1920.

The secretary is authorized by this law to issue permits

> . . . upon the express condition that such pipelines shall be constructed, operated, and maintained as common carriers and shall accept, convey, transport, *or purchase* without discrimination, oil or natural gas produced from government lands in the vicinity of the pipeline in such proportionate amounts as the Secretary of the Interior may, after a full hearing with due notice thereof to the interested parties and proper finding of facts, determine to be reasonable . . .

The issue in this case was raised by Interstate Natural Gas Co. of Los Angeles, a Nevada corporation, as an intervenor petitioning the commission for orders requiring San Juan Pipe Line Co. and El Paso Natural Gas Co. to operate their integrated pipeline systems as common carriers, filing common carrier rate schedules and allocating a substantial part of the capacities of their respective systems to common carrier service. Interstate failed on technicalities to make its case, having neither a firm supply nor a certain market, nor was it qualified as a corporation in the states where it proposed to do business. However, Interstate was permitted to develop in the record its claims and purposes and the effect of the Leasing Act of 1920 was squarely faced in the commission's opinion.

The opinion states that the Secretary of the Interior officially advised the commission that



a number of applications by El Paso for rights-of-way of public lands for pipeline purposes are pending before the secretary and that he proposed, in connection with any such permits issued hereafter, to require the applicant to file the following stipulation: "The applicant agrees to operate the pipeline as a common carrier and, within 30 days after the request of the Secretary of the Interior, to file a rate schedule and tariff for the transportation of oil or gas as a common carrier with any regulatory agency the secretary may prescribe."

He further stated that:

> We intend, upon the request of the commission or of an interested party to require the filing of the rate schedule and tariff with the Federal Power Commission.

After succinctly stating the case of the intervenor the commission's opinion comes directly to the heart of the matter stating:

> Clearly, after any company has been ordered by the Secretary of the Interior to file rates, and has done so, then this commission must consider the reasonableness of such rates. Before any transportation or sale for resale of natural gas in interstate commerce, even though the gas be transported by a common carrier, there must be compliance with the provisions of Sec. 7 (c) of the Natural Gas Act.
>
> When one considers the power of the commission with respect to the attachment of conditions to a certificate as provided in Sec. 7(e), sight must not be lost of the fact that such conditions must be reasonable "as the public convenience and necessity may require." Waiving for the moment all consideration of the commission's power to enforce such obligations as the two applicant companies may have as common carriers, under Sec. 28 of the Leasing Act, and bearing in mind that the El Paso system, which is the only one that can initially receive any gas for common carriage, is operating at a load factor of better than 90%, it assuredly cannot be said on this record that public convenience and necessity will be subserved by allocating at this time any portion of its system pipelines for common carrier transportation of 300 MMcf of gas per day and thereby necessarily frustrate El Paso's existing contracts, to the advantage of Interstate, which has not shown on this record that the public interest requires the service it proposes.

The action of the Federal Power Commission in this case has been awaited with the greatest of interest by communities in California as well as others in the states of Oregon and Washington where the early construction of adequate natural gas pipelines, whether from Alberta or from Texas, is eagerly awaited and where similar questions may conceivably arise.

The Interstate Natural Gas Co. of Los Angeles made no effort to comply with the clear provisions of the Natural Gas Act. No person may engage in the transportation or sale for resale of natural gas in interstate commerce without first obtaining from the Federal Power Commission a certificate of public convenience and necessity authorizing such transportation or sale. The authority of the commission to determine and effectively to condition its certificates has been so fully established that it cannot now be successfully challenged. The paragraphs last quoted from the commission's opinion are simple, comprehensive, and persuasive statements of these requirements.

The Interstate company ill-advisedly relied upon the several opinions and orders of the commission in the Montana-Dakota case in which the commission's action was sustained by the Eighth Circuit Court of Appeals.[2] The opinion of the court of appeals contains this brief paragraph:

> It is too clear for argument that the petitioner, having applied for and accepted a permit to do so and having constructed its pipeline over the public lands, became and is a statutory common carrier of natural gas and that its rates and schedules are subject to the jurisdiction of the Federal Power Commission under the Natural Gas Act.

The facts in that case were that Mon-

[1] Opinion No. 197, adopted July 14, 1950, in the matters of San Juan Pipe Line Co., El Paso Natural Gas Co., Pacific Gas & Electric Co.

[2] Montana-Dakota Utilities Co. vs. Federal Power Commission 169F(2)392.

tana-Dakota Utilities Co. had engaged in the pipeline transportation business, accepted the common carrier status and filed common carrier rates long before the Natural Gas Act was passed. FPC's only duty was to determine the reasonableness of the rates as the Natural Gas Act subsequently required.

The readers of *GAS* will remember the review of the somewhat lurid history and profitable adventures of Mondakota, its managers and affiliates, all of special interest to Californians since Interstate of Los Angeles seems to have had its antecedents and its inspiration in the Montana gas fields and the Mondakota companies.[3]

When the Natural Gas Act was passed in 1938 a qualified commentator stated that the act "seemed less stringent . . . than the Federal Power Act"; but the course of litigation since has been searching and voluminous, involving many more Supreme Court decisions than has the Federal Power Act.

This El Paso case raises a novel question of local interest particularly in the western states where government lands embrace large areas. As the result of less than 10 years of conspicuously successful litigation in the highest courts, the commission has established its power to regulate the price of gas from the wellhead almost to the burner-tips, because the gas moves without interruption between these points. The commission has consistently refused to define "service areas" and no service connection may be made or removed without specific authority of the commission, nor may deliverability be increased. FPC control of the trunklines is inexorably rigid.

"Convenience and Necessity"

Before the Federal Power Commission may grant a certificate of public convenience and necessity it must find by a preponderance of evidence adduced in public hearings that the applicant's specific project is or will be required to serve public convenience and necessity. Lawyers and courts have with varying degrees of success, attempted to define the phrase. The commission has its own "rule of thumb" but never regards its responsibility lightly. The law says if this condition is satisfied and the applicant is "able and willing" a certificate *shall* be issued. This brings us right back to the El Paso case and common carriers. Even a putative shipper by common carrier, as the opinion states, must comply with Sec. 7(c) of the Natural Gas Act.

In these recent months and years of greedy markets and easy money the commission has literally been deluged with new pipeline projects—small ones, middle-sized ones and very big ones. Many conflicts have arisen and the orders of the commission have revealed serious perplexities and at times uncertainties concerning the true course.

[3] *GAS*, March 1950, p. 86

New England Squabble Grows Hotter

On Oct. 4, the FPC accepted the recommendations of its staff (*GAS*, October, pp. 128-129) that neither Algonquin Gas Transmission Co. nor Northeastern Gas Transmission Co. be awarded a certificate of public convenience and necessity, and thereby set off a sequence of mad scrambling, charges, and counter-charges.

And by mid-month, both companies had filed new plans for serving New England. Northeastern proposed to build a line to serve all of New England, substituting 114 miles of 24-in. pipe for the 20-in. specified in the original application and boosting its ultimate capacity to 485 MMcf per day. Algonquin submitted a plan for a similar extension of its proposed system so as to serve the entire area, but supplemented this with an alternative—to divide the market with Northeastern along the lines of FPC staff recommendations.

Algonquin also said it was willing to purchase gas from Tennessee Gas and

(*Continued on Page 90*)

New England Struggle

Because of its basic relevancy to the "common carrier" question, viewed in the light of the paragraphs immediately preceding, let us examine the case of the rival giants and their clans just now "willing and able" to supply the industrialized areas of New England with Texas gas. Sanguinary battles have been joined for more than two years, with Tennessee Gas Transmission, Transcontinental, and Northeastern leading one group under the powerful aegis of Stone & Webster—White, Weld & Co.; in the rival group are Texas Eastern and Algonquin with financial backing in New York and close affiliations with United Gas and other important producers and financial interests.

Hearing records of the commission are unusually voluminous, the result of many months of contentious sessions. The records are now closed. The commission has considered the evidence. Political pressures have generated, induced by ordinary means but superstimulated by actual public demand for the magic fuel. The time for decision was reached and on Oct. 4 it was announced.[4] The conclusions of the commission are unprecedented and may have unusual significance if they do in fact, as some profess to believe, indicate a purpose to influence or control the corporate structures and policies of applicants, thus exercising regulatory powers to influence competitive and economic relationships.

The commission found that the service proposed by the two New England pipeline companies (Northeastern and Algonquin) competing for the New England market, does not meet the test of public convenience and necessity. It announced its willingness to reopen the record for supplementary evidence if necessary. The essence of the commission's action is contained in these paragraphs:

> It is clear to us that these applicants in proposing to make natural gas available to New England—a highly industrialized area with exteremely high fuel costs, and one of the few remaining areas in this country without natural gas—have placed their own selfish interests, and the interests of those with whom they are associated, above the best interests of the public.
>
> We are concerned here with a public need and demand for natural gas service in New England generally—not in a portion of that area and not by a few selected distributing companies in that area. It is inconceivable that anyone desirous of promoting the public good should urge that we now authorize one engaged in a business affected with the public interest to pick and choose whom it wishes to serve without proper regard for the public good. Nor should we authorize any applicant to render partial service when it is clear at the outset, as shown by this record, that its plans do not provide the full service to which the people of New England are entitled.

Vice Chairman Buchanan in a separate opinion took a different view, stating:

> I go back to the fundamental proposition that New England is entitled to natural gas at the earliest possible date. If the contending parties heretofore have not been able to get together to work out some cooperative plan so that such service can be rendered at the earliest possible date, then I believe it to be the duty of the commission to cut the Gordian knot and act upon the record that is already made even though that result may not achieve the ideal of all of us.
>
> This record, including testimony of the technical staff of the commission, will support, under commission standards, a certificate of public convenience and necessity to issue to Tennessee Gas Transmission Co. . . . Transcontinental Gas Pipe Line Corp., and Northeastern Gas Transmission Co. for the service they seek to render under their applications. I believe these certificates should issue forthwith and simultaneously the Algonquin application should be dismissed. The result would be, in addition to the service in the New York area, a gas supply for a part of New England in July 1951, with the great possibility that *all of the New England area* would begin to receive the benefits of natural gas *before the end of 1951.*
>
> The trouble in New England has been the struggle for management and control of the New England servicing company. In my opinion, the public convenience and necessity now requires the termination of that struggle in the public interest by commission action based on the record.

So—what *is* public convenience and necessity?

[4] Opinion No. 201.

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- Bearings were all in perfect condition.

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Shop tests had already proved TYPE UTC-16's more thorough scavenging, and perfect combustion. Now, this far more conclusive field test proved the ability to assure these benefits over a long, trouble-free service life. And a steadily growing list of purchasers has established TYPE UTC-16 as a real history-maker in the development of more efficient, more economical gas transmission.

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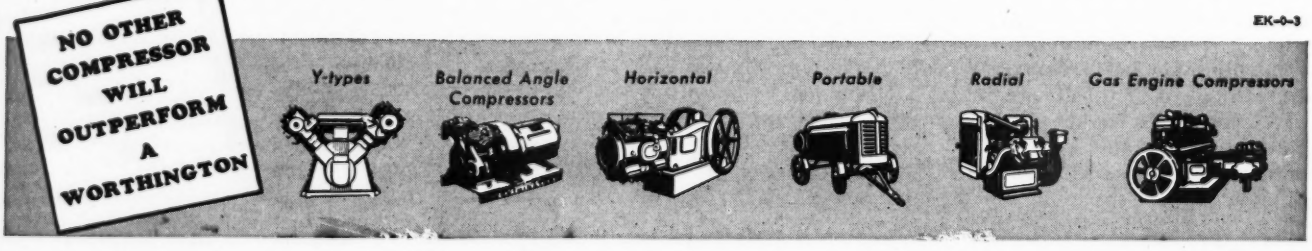
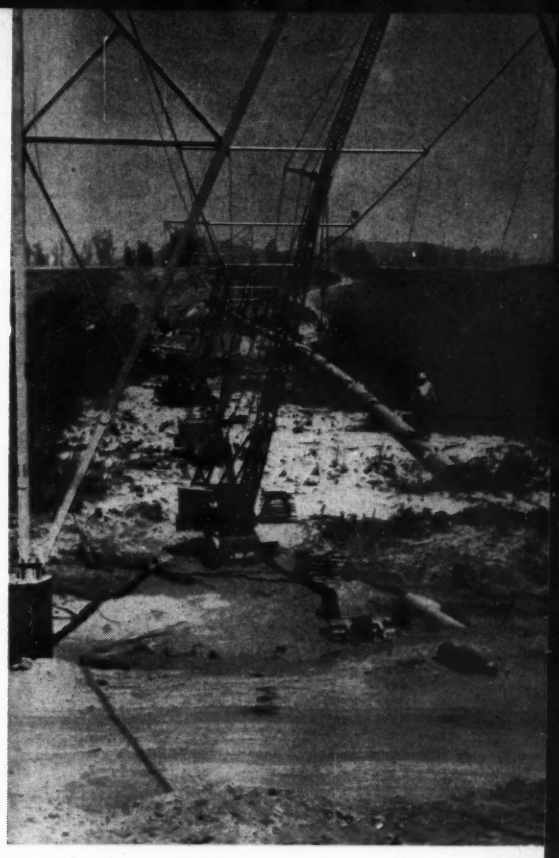
EK-0-3



Suspension Bridge Proves Tough Part of Biggest Inch Loop Job

The Santa Ana is a dry gulch for most of the year, but flash floods can make it a raging torrent—and the new looping pipeline had to go over, not under, its 735-ft width.



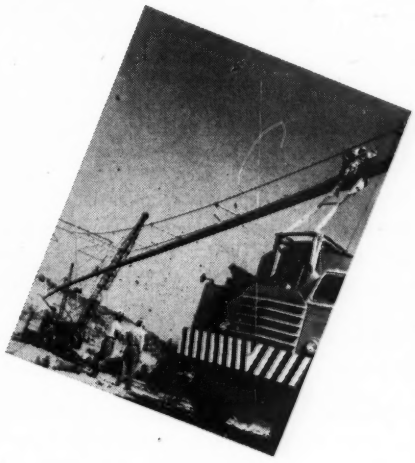
FULL LENGTH of pipeline that would form the bridge was pre-welded on the ground, raised in one huge piece to the bridge with five cranes. Bridge is the largest pipeline suspension ever built in southern California, helped two Los Angeles utilities to bring 100 MMcf daily of Texas gas to California a full three years ahead of schedule.

A FULL three years in advance of schedule, Southern California and Southern Counties Gas Co.'s, Los Angeles, are now receiving an additional 100 MMcf of mid-continent gas daily through the "Biggest Inch" Texas-California transmission line.

This increase in delivery capacity from 305 to 405 MMcf daily results from the completion of an 82-mile, $5 million loop in the California section, from Whitewater to a point just west of Puente, constructed by the Midwestern Constructors Inc., Tulsa, the Johnson Western Gunite Co. of San Pedro, Calif., and the L. E. Dixon Co., San Gabriel, Calif.

At Puente, the 30-in. coated, high-pressure steel line is tied into a 30-in. line laid last year in anticipation of this construction. A gas control station has been built at the point of connection.

In addition to the increase in delivery capacity daily, the new loop will maintain the storage capacities built into the "Biggest Inch" at the time of its original construction in 1947.



Revised Estimates

When the original "Biggest Inch" line was approved by FPC in 1946, it was contemplated that in late 1947, when completed, the line would carry 125 MMcf per day, increasing to 175 MMcf for 1948, 1949, and 1950, reaching full capacity of 305 MMcf in 1951. Later plans jacked up the ultimate capacity to 405, but this was not expected to be reached before 1953.

The El Paso Natural Gas Co., which constructed and operates the portion of the Texas-California line extending from Texas to the Colorado river, has just completed a number of additional loops similar in nature to the one completed by SoCal and SoCounties.

Consolidated Western Steel Co. (Maywood, Calif.) fabricated the 30-in. pipe for use in the line.

One of the most interesting features of the construction of the new loop was the raising of a 735-ft suspension bridge over the Santa Ana river. Normally a dry wash, the Santa Ana is subject to flash floods in the wintertime which have been known to turn the sand and sagebrush of the river bed into a raging torrent.

At first it was thought that an underground crossing might be made at the river, but when tests indicated that sand extended to a depth of 150 ft at midpoint of the channel, this proposition was discarded.

Designed by F. A. Sayler, and constructed and fabricated by Consolidated Western Steel, the span is composed of two structural steel towers 68 ft high and 62 ft wide placed on 4 ft caissons extending to bed rock. The main cables are 2 in. in diameter. The pipe is 22-in. OD of ⅜-in. wall high-strength steel.

Wider Towers

The usual construction for a bridge of this size is to add wind cables at the bottom of the tower. In consideration of both economic and safety factors the width of the towers was increased so that the main cables could carry both the vertical load and the wind load. Spacers were installed between main cables to hold cables in same relative position so they would act as designed.

The pipe itself was welded on the ground and raised to the span in one piece by five cranes acting as a team.

At that time, it was designed to carry approximately 52 MMcf in line pack. Heavy demands, however, have stepped up delivery rates to a point where this average could not be maintained.

PIPELINE NEWS

MONTANA LOOKS NORTH

Joins other areas in seeking Alberta gas

The question of whether, when, and where the province of Alberta would decide to permit export of its natural gas was still making news last month, with these developments reported from various sources:

Montana may get some of the Canadian gas under terms of an application filed by Canadian-Montana Gas Co. The company, which has bought holdings of Union Oil Co. of California and McColl-Frontenac Oil Co. in southeastern Alberta, would spend about $3.5 million for a line to serve Montana Power Co. The plea is to be heard Dec. 18.

Canadian Delhi Oil Co. Ltd., a subsidiary of Delhi Oil Corp. of Dallas, has filed for export to Saskatchewan, Manitoba, Ontario, and Quebec. Terminus of the $220 million, 2132-mile line would be Montreal. Capacity of the 30-in. pipe would be 365 MMcf. Canadian Delhi may seek a charter for the line under the name of Trans-Canada Pipe Line Co.

Things were popping on the Pacific Northwest Pipeline Corp.'s application to build a line from Texas to Washington state and a tie-in line from Alberta. The provincial conservation board on Oct. 9 began hearing the case involving an export permit for Prairie Pipelines Ltd., now an affiliate of Pacific Northwest, which would build the Canadian section of the line. Then the state of Idaho, through which the Texas line would run, filed an intervention with the FPC, which has Pacific Northwest's application under consideration. State Atty.-Gen. Robert E. Smylie, who served the notification, wanted all of Idaho, not just the southern part of the state, to be served by the line.

Mississippi River Fuel Requests Another Boost

A plan for additional compressor units totaling 22,000 hp in eight authorized compressor stations and 5500 hp in a new station has been presented to the Federal Power Commission by Mississippi River Fuel Corp. The St. Louis company recently received temporary authorization to increase its system capacity to 375 MMcf per day *(GAS,* Oct. p. 131); the new plan will up capacity to 435 MMcf.

Estimated cost of the project, which will help meet demands of present and authorized customers, is $5.5 million.

Niagara Asks Natural Gas To Take Properties out of Red

A 55-mile, 10¾-in. natural gas pipeline designed to serve natural to Watertown and other northeastern New York communities will be built by Niagara Mohawk Power Corp., Syracuse, if the company's current application to FPC is approved.

The proposed facilities will cost $2 million and will allow Niagara Mohawk to convert its present manufactured gas facilities in Watertown and surrounding communities to natural gas. The company, which says it can buy the neccessary supplies of gas from its affiliate, New York State Natural Gas Corp., has been operating the manufactured gas distribution systems at a loss for five years, according to the application. In 12 months to June 30, 1950 it lost $140,071; it expects, with natural gas, to earn $22,890 in 1952, $214,000 in 1955.

Wisconsin Plea for Hearing in Michigan-Wisconsin Case Fails

Joint applications of the state of Wisconsin and the Public Service Commission of Wisconsin for rehearing of proceedings involving Michigan-Wisconsin Pipe Line Co. and Michigan Consolidated Gas Co. have been denied by FPC.

Controversy was centered on the FPC authorization given Michigan-Wisconsin to construct facilities that will nearly double its annual sales capacity, and the okay given Michigan Consolidated to lease for operation storage facilities in Michigan to Michigan-Wisconsin.

The two state bodies charged that the commission had erred in estimating the earnings to be derived from these two developments, and in failing to take into consideration the great tax savings possible for Michigan-Wisconsin if a consolidated return is filed by the company and other subsidiaries of American Natural Gas Co. The commission found no facts in the application that it had not considered previous to granting the abovementioned authorizations.

Commissioner Thomas C. Buchanan dissented in both denials for rehearing.

Nevada Natural Files Plan To Build Las Vegas Line

A $2,331,350-project to take Texas gas from the El Paso Natural Gas Co. line and transport it to Las Vegas was filed with the FPC on Sept. 26 by Nevada Natural Gas Pipe Line Co., Los Angeles.

The main line (10¾-in.) would stretch 114 miles from the east bank of the Colorado river near Topock, Ariz., to Las Vegas. A 4-in. branch would extend 4½ miles to Boulder City, Nev., from west of the city and a 2½-in. branch would go to Needles, Calif., from 2½ miles west.

Completion is planned for as early as possible in 1951. Initial capacity would be 17 MMcf daily—1.7 MMcf to Boulder City, 1.2 MMcf to Needles. The company plans to sell gas to distributors: California Pacific Utilities Co., Needles; Boulder City (no gas now); and Las Vegas Gas Co., which is currently serving LP-Gas.

Leidy Connection Okayed

Late in September New York State Natural Gas Corp. asked the FPC for authority to build 44½ miles of 16- and 18-in. line to connect the Leidy gas field with its system in Pennsylvania, and last month the commission granted temporary authority for the company to proceed.

The $1.6 million line, scheduled for completion Nov. 1, will enable New York State Natural to take at least 60 MMcf daily from the Leidy field. The company has been transporting gas from the field through a 6-in. oil line which it leased temporarily.

Equitable Plan Approved

Temporary authorization has been granted by the FPC to Equitable Gas Co., Pittsburgh, to construct natural gas facilities near Waynesburg, Pa., which would increase the

New England Squabble Grows Hotter

(Continued from Page 87)

Transcontinental, suppliers and principal owners of the rival Northeastern system.

As pointed out in Mr. Crosby's article, the commission had decried the overlapping in the two applications and ordered both companies to submit new plans. Algonquin immediately announced it was ready to adopt any of three plans, including a merger with Northeastern for the purpose of setting up a single, joint system.

But when Algonquin got its new scheme before the commission Oct. 9, the merger was not a part of it. President Dana Swan charged Northeastern had failed to cooperate on such a program, and that its latest proposal would require extensive new engineering studies with attendant delays in the proceedings.

In its new application, Northeastern also offered to serve as contract carrier, carrying Texas Eastern gas to Algonquin's customers, but R. H. Hargrove, Texas Eastern president, flatly refused. "Northeastern is wholly-owned and controlled by Tennessee and Transcontinental, which are commonly known to be Stone & Webster interests," he said.

"These interests already dominate such a substantial segment of the industry that further expansion of their dominance would seem to be of dubious value to the public. This plan . . . would, in my opinion . . . (put) New England gas consumers for all time to come in a position of dependence on such a monopoly."

Without Texas Eastern's help, Northeastern's parent, Tennessee Gas, would have to build a fourth line from Texas (in order to serve all of New England).

Northeastern in turn had charged that Algonquin was dominated by coal interests—Eastern Gas & Fuel Associates and Koppers Co. Mr. Swan said that Eastern owns only 33% of Algonquin stock, the rest being split among Providence Gas Co., Texas Eastern, and New England Gas & Electric Assn.

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system capacity by about 21 MMcf daily.

To cost $1.7 million, the project includes a compressor station with four 880-hp units, a dehydration plant, and about 17 miles of 6-, 8-, 12-, and 16-in. line. The new lines will connect the compressor station with other Equitable lines, with the Texas Eastern Transmission Co. system, and with the Pratt and Jefferson storage pools.

Booster Increase Gets Okay

Additional compressor units on its line at an existing compressor station have been authorized for Michigan Gas Storage Co. (Jackson) by FPC.

The company will add 2200 hp at a cost of $765,600. The addition is designed to allow Michigan Gas to pump additional gas from its storage fields for delivery to Consumers Power Co., also of Jackson, which in turn will serve it to the cities of Pontiac, Jackson, Marshall, Kalamazoo, Hastings, Owosso, Flint, Saginaw, Alma, and Bay City.

Buried Rock May Yield Gas

Deeply buried rock formations in southeastern Montana and adjacent parts of Wyoming and South Dakota may contain hitherto unknown deposits of oil and gas. This opinion has been expressed by the Geological Survey, U. S. Dept. of the Interior.

The agency has plotted these areas on a newly published chart, and accompanying text describes surface outcroppings that are already the objective of oil-company drilling programs. Copies of the chart (OC 40) are available from the Geological Survey, Washington, D.C., at 50 cents each.

WITH OHIO OPERATIONS well behind them, construction crews working on the Buffalo extension of Tennessee Gas Transmission Co.'s main line are highballing through Pennsylvania on their way to the northern New York terminus. Here sparks fly as a welder's helper guides a cutting machine to burn its way through the 26-in. pipe.

Trinidad Asks for Natural

The city of Trindad, Colo. has asked FPC to order Colorado Interstate Gas Co., Colorado Springs, to connect its pipeline facilities to those that the city proposes to build, and to sell 1 MMcf daily of natural for distribution in Trinidad.

The city proposes to build a 35-mile, 8⅝-in. pipeline from Colorado Interstate's facilities to a distribution system in Trinidad.

Obsolescence and high cost have caused abandonment of the city's manufactured gas distribution system.

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Progress Reports

Planned

ALGONQUIN GAS TRANSMISSION CO. two plans to serve New England.

ARKANSAS-MISSOURI POWER CO., Blytheville, Ark. To build line from Big Inch to serve 12 towns in two states. To start within year.

ATLANTIC GULF GAS CO., 1500 miles, Alabama to Florida, Georgia, South Carolina.

CAROLINA NATURAL GAS CORP., Charlotte, N. C., 372 miles, 18 lines, from Transcontinental Gas Pipe Line Corp. main line to North and South Carolina communities.

CITIZENS GAS CO., Stroudsburg, Pa., **BANGOR (PA.) GAS CO., PEN ARGYL GAS CO.,** subsidiaries of Penn Fuel Gas Inc., laterals to receive gas from Manufacturers Light & Heat Co.

CITIES OF BOONEVILLE, RIPLEY, BALDWYN, Miss., to connect with Tennessee main line in Benton county, 16 miles of 6-in., 23 more miles, 11-mile tap.

CITY OF TRINIDAD, COLO., a 35-mile, 8⅝-in. line from Colorado Interstate's facilities to a distribution system to be built in Trinidad.

CONSUMERS GAS CO., Toronto, Can., 85 miles, Buffalo to Toronto.

GEORGIA NATURAL GAS CO., Albany, Ga., Phenix City, Ala., to Tallahassee with laterals and branches. $5.1 million.

JERSEY CENTRAL POWER & LIGHT CO., Asbury Park, 7 miles.

LAKE SHORE PIPELINE CO., ERIE GAS SERVICE CO. INC., and GRAND RIVER GAS TRANSMISSION CO., pipelines from a Meadville, Pa., connection with Tennessee Gas Transmission's line westward to Ohio.

MIDSOUTH GAS CO., Little Rock, 240 miles northerly from Helena, Ark.

MISSISSIPPI RIVER FUEL CORP., St. Louis, 22,000 hp in 8 authorized compressor stations and 5500 hp in a new one.

NEVADA NATURAL GAS PIPE LINE CO., 122 miles of 10¾-in. line from Topock, Ariz., to Las Vegas, Nev. Includes a 4-in. branch starting 4½ miles west of Boulder City and a 2½-in. branch from 2½ miles west of Needles into the city. To be finished early as possible in 1951.

NIAGARA MOHAWK POWER CORP., Syracuse, N. Y., 55-mile, 10¾-in. line to supply Watertown and other communities.

NORTHEASTERN GAS TRANSMISSION CO., two plans to serve New England.

NORTHERN INDIANA FUEL & LIGHT CO., Auburn, Ind., 31-mile, 8⅝-in. line to carry gas to northeastern Indiana. Cost: $511,315.

NORTHWEST NATURAL GAS CO., for 700 miles in Washington, Idaho, Oregon.

OHIO FUEL GAS CO., Columbus, 6 miles 18-in. sectional replacements between Sugar Grove and Mt. Sterling to be completed in Sept.; 22 miles 20-in. vicinity of Fremont and Lime City. Nov. completion expected.

PACIFIC NORTHWEST PIPELINE CORP., 2175 miles of 26-in. from southern Texas to Seattle, Wash., Vancouver, B.C., via Oklahoma, Kansas, Colorado, Wyoming, Idaho, Oregon, Washington.

PANHANDLE EASTERN PIPE LINE CO., Kansas City, Mo., for 185 miles and 16,000 hp in compressor stations. Knupp Construction Co., Great Bend, Kan., is at work on an 85-mile, 4 to 12-in. gathering system in Hugoton field.

PEOPLES NATURAL GAS CO., Pittsburgh, 16 miles of 8- and 10-in., from Tennessee Gas spur in Big Beaver to borough of Midland, Beaver county, Pa. Start July, complete August.

PIEDMONT NATURAL GAS CO. INC., Spartanburg, S. C., six laterals totaling 74 miles from Transcontinental main line to North and South Carolina cities.

PUBLIC SERVICE CO. OF COLORADO, pipeline from the Piceance Creek field in western Colorado to Grand Junction and Rifle.

PUBLIC SERVICE CO. OF NORTH CAROLINA INC., Gastonia, 365 miles connecting at 10 points with Transcontinental main line in North and South Carolina.

SHENANDOAH GAS CO., Lynchburg, Va., for 49 miles from near Cedarville, Va., to cities in Virginia and West Virginia.

SOUTH CENTRAL ALABAMA NATURAL GAS CO. INC., 150-mile pipeline from a connection with Southern Natural's line in Elmore county.

SOUTHEASTERN MICHIGAN GAS CO., Chicago, 55 miles of 12-in. from connection with Panhandle Eastern main line in Oakland county, Mich., to Marysville, Mich.

SOUTH GEORGIA GAS CO., Atlanta, for 527 miles from northern Georgia into Florida to serve new markets in the two states.

SOUTH JERSEY GAS CO., Atlantic City, 77 miles, Camden to Atlantic City.

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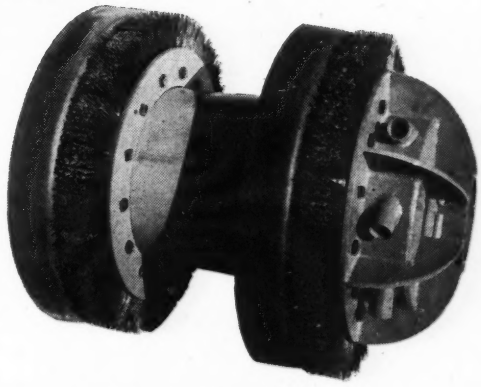

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SOUTHERN UNION GAS CO., Dallas, for 15 miles of 10-in. and 12-in. from Kutz canyon to Blanco gas field, N. Mex.

TEXAS EASTERN TRANSMISSION CORP., Shreveport, to boost capacity to 476 MMcf, 791 miles 30-in. from Kosciusko, Miss., to Connellsville, Pa.; seven compressor stations with 46,400 hp on new line, six with 52,500 hp on existing line; short lines in New York area; 35 miles of 30-in. from Fayette county, Pa., to Westmoreland county, Pa.

TEXAS ILLINOIS NATURAL GAS PIPELINE CO., Chicago, to build 72 miles of line in Texas and change some compressor units to increase system capacity.

TRANSCONTINENTAL GAS PIPE LINE CORP., Houston, 11-mile mainline extension, 20- to 26-in. pipe, East Carteret, N. J., to Brooklyn.

UNITED FUEL GAS CO., Charleston, W. Va., 5.5 miles, 6450-hp compressor stations to deliver gas to storage pools in West Virginia.

UNITED GAS PIPE LINE CO., Shreveport, 1005 miles in Texas, Louisiana, and Mississippi. Includes 451 miles 30-in., 6 miles 26-in., 53 miles 24-in. from Agua Dulce field in south Texas to Monroe, La.; about 245 miles of 30, 26, 24, and 20-in. from Gulf of Mexico northeast to Jackson, Miss.; 215 miles from this line to near Kosciusko, Miss.; 24 miles 8, 12, and 16-in. in south Louisiana; 16 miles of 16-in. from Koran gasoline plant site, La., to its Carthage-Sterlington line in Louisiana; 4000-hp compressor, dehydration plant.

VALLEY GAS PIPE LINE CO. INC., Houston, $144.5 million, 1000 miles of 30-in., from Hardin county, Texas, to southern Michigan, plus 500 miles of 24-in. in Texas and Louisiana, plus laterals, two 13,500-hp compressor stations, plus others aggregating 70,000 hp. Wants to start by Dec. 31, complete April 1, 1952.

Approved

AMERE GAS UTILITIES CO., Charleston and **BLUEFIELD (W.VA.) GAS CO.,** for service to Bluefield, Va., and Bluefield, W. Va. Amere, a measuring and regulating station. Bluefield Gas 14.3 miles of 6⅝-in. and regulating station.

EQUITABLE GAS CO., Pittsburgh, 17 miles of 8- to 16-in., 3520-hp booster, dehydration plant, near Waynesburg, Pa.

MICHIGAN GAS STORAGE CO., Jackson, Mich., to install two 2200-hp compressor units at an existing station in Michigan. Cost: $765,600.

MIDSOUTH GAS CO., Litle Rock, to acquire from Arkansas Power & Light Co. 26 miles of main line and distribution systems serving eastern Arkansas.

NEW YORK STATE NATURAL GAS CORP. to build 44½ miles of 16- and 18-in. to connect the Leidy gas field with its system in Penn.

UNITED GAS PIPE LINE CO., Shreveport, 16 miles of line, a compressor station and a dehydration plant in Webster, Bossier, and Ouachita parishes, La.

Contracts Let

UNION GAS CO. OF CANADA LTD. has awarded Shaw Construction Co., Sarnia, Ont., contract for a 16-in. line extending 61 miles from Windsor, Ont., to Dawn township. Construction was to begin early last month; completion expected in about 6 months.

Under Way

ACME NATURAL GAS CO. has Williams-Austin Co., Pittsburgh, building 25½ miles of 10-in. from Ellwood City to Butler, Pa. 75% complete.

ALABAMA-TENNESSEE NATURAL GAS CO., Florence, Ala., 45 miles of 8¾-in. from Muscle Shoals, Ala., to Decatur. Also includes 1½-mile river crossing at Decatur. Started Oct. 15 by Lehman-Hoge & Scott, Harlingen, Texas. To be completed Dec. 1.

CENTRAL KENTUCKY NATURAL GAS CO. has Williams-Austin Co., Pittsburgh, at work on 42 miles of 20-in. from North Means compressor station to Foster, Ky. 20% complete.

EAST OHIO GAS CO., Cleveland, 24 miles 20-in. in Mahoning county, Ohio. 10% completed Oct. 15. About 20 miles by Nov. 15. To be fnished Nov. 30.

EL PASO NATURAL GAS CO., line from San Juan basin, New Mexico, to Topock, Ariz. Work began in Sept. near Farmington, N.M., on the 433-mile, 24-in. line. To be completed Jan. 1.

KANSAS-NEBRASKA NATURAL GAS CO., Phillipsburg, Kan., 1640-hp compressor addition, 4 miles of 2-in.; replace 16 miles of 8-in. with 12-in., 22 miles of 6-in. with 8-in., 8 miles of 4-in. with 6- and 8-in.; loop 6 miles.

MANUFACTURERS LIGHT & HEAT CO., CUMBERLAND & ALLEGHENY GAS CO., NATURAL GAS CO. OF W. VA., and HOME GAS CO. Manufacturers: 44 miles 4- and 16-in. in Ohio, Pa., and W. Va., and two 500-hp units. Cumberland: 10.3 miles 6- and 8-in. and a 65-hp station in W. Va. Natural Gas Co.: 4.5 miles of 4-, 6-, and 8-in. in Ohio. Home: meter and regulating station in Rockland county, N. Y.

NEW YORK STATE NATURAL GAS CORP., New York, 63 miles of 20-in., from Westmoreland county to Pennsylvania-Ohio line to connect with East Ohio Gas Co., Cleveland. Tulsa Williams Co. at work on 38 miles; Williams-Austin Co. at work on 21 miles. Right-of-way cleared, ditching started. Both spreads to be completed Dec. 1.

MICHIGAN GAS STORAGE CO., Detroit, 83 miles

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22-in. Ovid, Mich., to Muskegon river, started Aug. 1, to be completed Nov. 15. Hampered by rainy weather during past month. 7600-hp compressor station near Marion, Mich. to be completed Dec. 1. Mahoney Contracting Co.

NATURAL GAS PIPELINE CO. OF AMERICA, Chicago, has L. R. Young Construction Co., Olney, Ill., building a 7-mile lateral from company's main line to Creston, Iowa. Started Oct. 9; to be finished in early November.

NORTHERN NATURAL GAS CO., Omaha, under way on 597 miles of mainline loops. 155 miles of 20-in. in Kansas, Fulton under way; 222 miles of 26-in. in Oklahoma and Kansas, Fulton, under way; Midwestern Constructors Inc. nearing completion on 43.4 miles of 26-in. between Palmyra, Neb., and Oakland, Iowa; Reese Bros. Construction Co., Hugoton, Kan., will complete 99 miles 4- to 10-in gathering system in Hugoton area by Dec. 1. Mary Construction Co. under way on 111 miles of 26-in. near Ogden and Ventura, Iowa. Parkhill Truck Co. is stringing 109 miles for Midwestern and 112 miles for Mary.

PACIFIC GAS & ELECTRIC CO., San Francisco. Bechtel-Price-Conyes under way on 506 miles 34-in., Topock, Ariz., to Milpitas, Calif.

PHILLIPS PETROLEUM CO., Bartlesville, Okla., 118 miles of gathering lines in Sherman and Hansford counties, Texas. Vaughn & Taylor. Cheek Construction Co., Ulysses, Kan., to complete 151 miles 6-in. from La Junta to Denver by Nov. 15.

PRINCE GEORGE'S GAS CORP., 18.5 miles 22-in. to Washington, D. C., metropolitan area started Aug. 15; to be completed Dec. 1. Holland Construction Co.

SOUTHERN NATURAL GAS CO., Birmingham, Ala., to start soon on 232 miles of tap lines and loops in Georgia, South Carolina, Alabama, and Mississippi; 184 miles of loops and extensions in the same states; has Sheehan Pipeline Construction Co. working on 180 miles of 18-in. from Gwinville, Miss., to Selma, Ala. Two spreads 70% complete. Sheehan also building 32 miles 16-in. near Wetumpka, Ala., started Oct. 23; and two river crews have completed 2 crossings, just started 2, and are 80% finished with one. Ford, Bacon & Davis to build two Mississippi taps and install 11,000 hp in existing stations. J. L. Cox & Son, Raytown, Mo., is stringing 240 miles 16-, 18-, and 24-in. in Alabama, Mississippi, and Georgia.

SOUTHWEST GAS CORP., Barstow, Calif., is building a 2-mile line to Barstow from the PG&E main line; 4 miles, Barstow to U. S. Marine Corps base at Nevo; 27 miles to George air base and 5 miles from there to Victorville. All 4½-in. pipe. To be completed Jan. 1.

TENNESSEE GAS TRANSMISSION CO., Houston, has Latex Construction Co. working on 99 miles of 30-in., 68 miles from West Monroe to Natchitoches, La., completed. Remaining 32 miles from Eudora, Ark., underway; 95 miles of 20-in. from Natchitoches to Kinder, one spread finished; 102 miles of 16-in. and 11 miles of 12-in. from Kinder to Bayou Sale, La., underway; H. C. Price Co. working on remaining 153 miles of line to Buffalo through New York and Pennsylvania. Completion scheduled for Nov. Price and Morrison Construction Co. laying 158 miles of 30-in. in western Tennessee and Kentucky. Completed in mid-October. Latex working on 10 miles of 26-in. in vicinity of Greenville, Miss. river bridge, was to be completed Oct. 25; two 16-in. submarine lines below Greenville bridge, started last winter, work resumed recently. Latex also working on 15 miles 12-in. from north of Delcambre, La. to vicinity of Tigre Lagoon. Started Oct. 10.

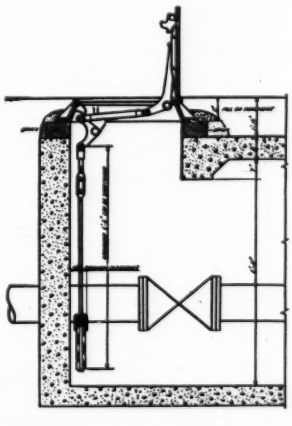
TENNESSEE NATURAL GAS LINES INC., Nashville, 24 miles of line and 4 meter and regulator stations, near Nashville. To be completed Dec. 1. Contractor: N. A. Saigh Co., San Antonio.

TEXAS GAS TRANSMISSION CO., Houston, has J. Ray McDermott & Co. Inc., Harvey, La., at work on 12-in. line from Slaughters, Ky., to Evansville, Ind.

TEXAS-ILLINOIS NATURAL GAS PIPELINE CO., Chicago, on its 1331-mile line, to Midwestern Constructors, Inc., 100 miles of 26-in. from La-Gloria, Texas, to Refugio, Texas—pipe laying to start Nov. 1; 100 miles of 30-in. from Mississippi river to Effingham, Ill., work started Sept. 25; 100 miles of 30-in. from Effingham to Sibley, Ill., and 92 miles from Sibley to Joliet, Ill.—both to start in 1951; Illinois river crossing near Morris. H. C. Price Co. is under way on 480 miles from near Refugio northeastward to Texas-Arkansas state line. Includes 38 miles, 12-in., 36 miles 24-in., 97 miles 26-in., 309 miles 30-in. Bechtel Corp. under way on 409-mile 30-in. line from Newport, Ark. Parkhill Truck Co. stringing for both jobs. Fish Constructors Inc., Houston, is building a compressor station four miles northwest of New Caney, Ill.

TRANSCONTINENTAL GAS PIPE LINE CORP., Houston, on its Texas-to-New York line. Victoria Oil Field Maintenance, Falfurrias, Texas, 90% complete on 61.3 miles of 6, 8 and 10-in. gathering line. Fish Constructors Inc., Houston, is building a $2 million compressor station at Dinan, Texas. Construction will take 9 to 12 months.

TRUNKLINE GAS SUPPLY CO., Houston, has Houston Contracting Co. working on 176 miles of 26-in. from Longville to Darnell, La., and 59 miles of gathering lines out of Longville, La. Total completion: Dec. 20. Anderson Bros. Corp. at work on 180 miles, 26-in., Darnell to Senatobia, Miss., and 217 miles 24-in. Longville to Garwood, Texas. Parkhill Truck Co. stringing above jobs. On 740-mile, Louisiana-to-Illinois line, R. H. Fulton, Lubbock, Texas, is working on 278 miles of 12- and 20-in. and 184 miles of 26-in. Mahoney Contracting Co. under way on 186 miles of 26-in. Four major river crossings to be made under Mississippi, Ohio, Washita, and Red rivers. Anderson Bros. have contract for the first, J. Ray McDermott & Co. for the other three. Project will include six other river crossings for which contracts are not let.



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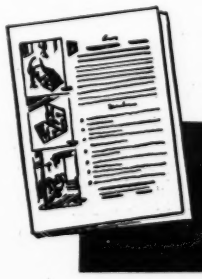

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Pipeline People

Volney H. Kyle

Election of VOLNEY H. KYLE JR. as vice president and manager of operations for Michigan-Wisconsin Pipe Line Co., Detroit, has been announced. Mr. Kyle has been associated with the company since last January. Before that, he served for 12 years as an engineer on the staff of Ford, Bacon & Davis and assumed responsibility in the field for construction of the 1500-mile Michigan-Wisconsin line which was recently completed. In 1927, Mr. Kyle assisted in construction of the Interstate Natural Gas Co. line, one of the first large-diameter cross-country lines built.

C. L. McDougall

The Cooper-Bessemer Corp., Mount Vernon, Ohio, has named CLAYTON L. MCDOUGALL sales and engineering representative in its Odessa, Texas, office. Mr. McDougall has spent six years at the firm's headquarters. The Odessa office is under the direction of ARTHUR W. ABEL JR., branch manager. Mr. McDougall will concentrate on gas and diesel engines, engine-driven compressors and liquid pumps for petroleum processing and transmission service.

JOHN V. JIRASEK has been appointed manager of sales activities in the Petrochemical industries for Worthington Pump & Machinery Corp., Harrison, N.J. Mr. Jirasek, who holds a chemical engineering degree from the University of Prague and undertook post graduate work at Sorbonne, Paris, joined Worthington as a special representative in 1940.

Transcontinental Gas Pipe Line Corp., Houston, has appointed two key operating men and made one promotion. WALTER H. DAVIDSON, superintendent of construction, is now general superintendent of the Texas-New York line. RAYMOND CROWE has been named chief engineer and F. B. HAVERFIELD superintendent of compressor stations. Mr. Crowe was formerly with Stone & Webster Engineering Corp. and Mr. Haverfield was with Continental Oil Co.

Newly appointed corrosion engineer of Panhandle Eastern Pipe Line Co.'s (Kansas City) eastern pipeline division is ORVILLE E. MOORE. He replaced JOHN C. BERRINGER who will assist D. K. STEPHENS, superintendent of transmission pipelines, in cathodic protection work. Mr. Moore is headquartering in Zionsville, Ind., Mr. Berringer in Kansas City.